

# The National Cohesive Wildland Fire Management Strategy: Phase III Western Regional Science-Based Risk Analysis Report

A photograph of a forest landscape. The background shows a dense forest of tall, thin trees, many of which are dead and grey, interspersed with some green evergreens. The sky is blue with white clouds. In the foreground, three large, detailed pine cones are shown, two on the left and one on the right, resting on a dark green surface.

Final Report of the Western Regional  
Strategy Committee  
November 2012



# Table of Contents

---

<b>Executive Summary</b> .....	<b>4</b>
<b>Recommendations</b> .....	<b>5</b>
<b>Next Steps</b> .....	<b>6</b>
<b>Introduction</b> .....	<b>7</b>
Figure 1. Counties that have CWPPs or community CWPPs within them. ....	8
<b>Three Phases of the Cohesive Strategy</b> .....	<b>9</b>
<b>Core Values and Vision for the Future</b> .....	<b>9</b>
<b>Guiding Principles</b> .....	<b>9</b>
<b>The Three National Goals</b> .....	<b>10</b>
<b>Stakeholder Engagement</b> .....	<b>10</b>
<b>Collaboration Focus of the Cohesive Strategy</b> .....	<b>10</b>
<b>Phase III is not the end but a beginning</b> .....	<b>11</b>
<b>Data and Methods for Exploring Opportunities to Reduce Risk</b> .....	<b>11</b>
<b>Introduction</b> .....	<b>11</b>
<b>Modeling</b> .....	<b>12</b>
<b>Data Gaps</b> .....	<b>13</b>
<b>The Risk Analysis</b> .....	<b>13</b>
<b>Wildland Fire is an Important Western Issue</b> .....	<b>13</b>
<b>Wildland Fire Varies Across the Landscape</b> .....	<b>14</b>
<b>Landscape Management Can Reduce Wildfire Severity</b> .....	<b>14</b>
<b>Addressing the Middle Ground</b> .....	<b>15</b>
<b>The Management Alternatives</b> .....	<b>15</b>
<b>Alternative #1: Landscape Resiliency</b> .....	<b>15</b>
<b>Focus areas:</b> .....	<b>16</b>
Figure 2. Areas Available for Mechanical Treatment .....	16
Figure 3. Annual Mill Production. ....	17
Figure 4. Areas Available for Prescribed Fire. ....	17
Figure 5. Smoke Plume Seasonality .....	19
<b>Resilient Landscapes</b> .....	<b>19</b>
<b>Fuels and Climate</b> .....	<b>20</b>
Figure 6. Surface Fuel Type. ....	20
Figure 7. Average Summer Precipitation .....	20
<b>Ecological Conditions</b> .....	<b>21</b>
Figure 8. Vegetation Departure Index Map. ....	21
Figure 9. From the Forests to the Faucets: Surface Drinking Water Importance Index, IMP. . .	22
<b>Insects and Diseases</b> .....	<b>22</b>
Figure 10. Annual extent of insect and disease forest mortality summarized from the annual survey 1998 to 2011. ....	23
Figure 11. Counties reporting mountain pine beetle in 2011.....	23
<b>Ignitions, Burn Probability and Acres Burned</b> .....	<b>24</b>
Figure 12. Percent of known fire causes from natural ignitions including lightning. ....	24
Figure 13. Western counties categorized by the percent of county area with slopes exceeding 15 percent.....	24



Table 1. A Decade of Fire Causes and Number of Acres Burned in the West. . . . .	25
Figure 14. Mean Burn Probability . . . . .	26
Figure 15. Acres burned per 100 square miles by large fires (300 acres or greater in size) between 2001 and 2011. . . . .	26
Figure 16. Percent area within each county disturbed by fire shown in eight broad categories. .	27
Figure 17. Acres burned in the 11 Western States between 1916 and 2011. . . . .	28
Table 2. Wildfire Statistics by Region. Source: NIFC, 2012 data through October 9. . . . .	28
<b>Land Ownership – The West is Unique . . . . .</b>	<b>29</b>
Figure 18. Land ownership in the Western US. . . . .	29
Figure 19. Percentage of each state administered by the federal government. . . . .	29
<b>Native American Cultural History. . . . .</b>	<b>30</b>
Figure 20. Native American Linguistic map. . . . .	30
Figure 21. Percent of county land area administered by the BIA and recognized tribal lands. .	31
Smoke Management . . . . .	31
Figure 22. Average annual number of smoke plumes passing over counties. . . . .	31
<b>Alternative #2: Fire Adapted Communities . . . . .</b>	<b>32</b>
<b>Focus areas: . . . . .</b>	<b>32</b>
<b>Risk to Fire Adapted Communities . . . . .</b>	<b>33</b>
Figure 23. National Hazard and Risk of Wildfire. . . . .	34
<b>Housing Density in the WUI. . . . .</b>	<b>35</b>
Figure 24. Counties with moderate or higher burn probability and a large percentage of housing units in the WUI. . . . .	35
<b>Smoke Hazards . . . . .</b>	<b>35</b>
Figure 25. Smoke Plume viewed from space. . . . .	36
<b>Advantaged and Stressed Communities . . . . .</b>	<b>36</b>
Figure 26. Western counties categorized by socio-economic stress and advantage. . . . .	37
<b>Open Space Islands. . . . .</b>	<b>37</b>
<b>Hazard and Risk at the County Level. . . . .</b>	<b>37</b>
Figure 27. Counties categorized by the percent of county area rated as high-risk or greater by AnchorPoint’s No-HARM wildfire risk model. . . . .	38
<b>Social Science and Fire Adapted Communities . . . . .</b>	<b>38</b>
Figure 28. Elements of a fire adapted community. . . . .	39
<b>Community Wildfire Protection Planning . . . . .</b>	<b>39</b>
Figure 29. Counties that include communities with CWPPs or with county-wide CWPPs. . . .	39
Figure 30. Counties reporting adaptation activities including CWPPs, ordinances, and CFLRP projects. . . . .	40
<b>Fire Adaptation Activities. . . . .</b>	<b>40</b>
<b>Public Perceptions of Wildland Fire in Social Science . . . . .</b>	<b>41</b>
Figure 31. Factors influencing public acceptance of fire and fuels management activities. . . .	42
<b>Regional Models of fire adapted communities in resilient landscapes . . . . .</b>	<b>42</b>
<b>Potential Outcomes . . . . .</b>	<b>43</b>
<b>Potential Impact of Fire Adapted Communities Actions. . . . .</b>	<b>43</b>
<b>Strategy for Fostering Fire Adapted Communities . . . . .</b>	<b>44</b>
<b>Alternative #3 – Fire Response. . . . .</b>	<b>44</b>
<b>Focus Areas . . . . .</b>	<b>45</b>
<b>Fire Response . . . . .</b>	<b>46</b>



<b>Vegetation profile as it relates to fuels</b> .....	<b>47</b>
Figure 32. Western counties categorized in seven broad categories of surface fuel type based on proportion of area in the county. ....	47
Figure 33. Mean annual MODIS hotspot detections per 100 square miles, from 2001-2011. . . .	48
Figure 34. Reported incidents attributed to accidental ignitions using state, federal and local (NFIRS) data of known cause. ....	48
Figure 35. Reported incidents attributed to accidental ignitions using state, federal and local (NFIRS) data of known cause. ....	49
Figure 36. Reported incidents attributed to intentional ignitions using state, federal and local (NFIRS) data of known cause. ....	49
Figure 37. Acres burned per 100 square miles by large fires (300 acres or greater in size) between 2001 and 2011. ....	50
<b>Workload</b> .....	<b>50</b>
<b>Land ownership and the dynamics that affect response</b> .....	<b>50</b>
<b>Response capacity, limitations, challenges</b> .....	<b>51</b>
Figure 38. Western counties categorized by the mean number of fire stations per 100 square miles. ....	51
Figure 39. Average number of fire stations and locally reported fires per year for Western states. ....	51
<b>Fire Prevention and Evacuation Preparedness</b> .....	<b>52</b>
<b>Response Capacity and Coordination</b> .....	<b>52</b>
Figure 40. Seasonality of hotspots detected from space by the Terra and Aqua satellites since 2000. ....	53
<b>Protection Values and Incident Prioritization</b> .....	<b>54</b>
<b>Measuring Progress Toward the Goals</b> .....	<b>55</b>
<b>National Performance Measures</b> .....	<b>55</b>
<b>How Decision-makers Can Use the Alternatives</b> .....	<b>55</b>
<b>Recommendations</b> .....	<b>57</b>
<b>Next Steps</b> .....	<b>59</b>
<b>Western Regional Science-Based Risk Analysis Report Appendices</b> .....	<b>60</b>
<b>Appendix 1 – Glossary</b> .....	<b>60</b>
<b>Appendix 2 – Acronyms</b> .....	<b>61</b>
<b>Appendix 3 – References and Bibliography</b> .....	<b>62</b>
<b>Appendix 4 – Science and Models</b> .....	<b>63</b>
<b>Appendix 5 – Stakeholder Involvement</b> .....	<b>72</b>
Summary of Trip Reports through 8/3/2012. ....	74
<b>Appendix 6 – Communications Activities (Communications Team)</b> .....	<b>76</b>
Summary of Efforts in Phase III .....	76
Living with Wildfire: The State of Practice in Western Communities .....	76
Cohesive Strategy Success Story Framework .....	77
CWPP to Protect Landscapes & Communities: CWPPs and the Middle Ground .....	78
Information and Resources for Communities, Agencies, and Other Stakeholders .....	80
Conclusions and Next Steps for Communications .....	81
Monthly Updates .....	82
<b>Appendix 7 – Useful Links</b> .....	<b>96</b>
<b>Appendix 8 – Committee and Work Group Members</b> .....	<b>97</b>

## Executive Summary

*The National Cohesive Wildland Fire Management Strategy: Phase III Western Regional Science-Based Risk Analysis Report* (Western Regional Risk Report) has been developed by representatives of federal, state, local, and tribal governments, interested governmental and non governmental organizations, businesses and industries to comprehensively address issues relating to wildland fire in the West. The Western Regional Strategy Committee (WRSC) was developed to provide inclusiveness and transparency to stakeholders in the process of addressing the wildland fire challenge, while focusing on the three goals of the Cohesive Strategy: Restoring and maintaining resilient landscapes, Creating fire adapted communities, and Responding to wildfires. Stakeholder input has been instrumental in forming the risk analysis and alternatives to address the wildland fire management issues in the 17 Western states.

The Western landscape is diverse and reaches from the plains states of Kansas and Nebraska to Hawaii, Alaska and the western pacific islands such as Guam and American Samoa. This diverse landscape creates strengths and weaknesses. One identified weakness concerns availability of data across all lands. A need for data from our island partners and Alaska has been identified, and the Western region will work to address this need in the future.

The Western Region contains a vast amount of land administered by federal agencies, which creates opportunities and challenges. The West has significant wildland fire risks from overstocked fuel conditions, insects and disease, invasive species, and urban development in wildland urban interface areas (WUI). Restoring landscapes to a healthy, resilient state would generate important environmental and social benefits, create much-needed jobs and revenue for rural economies, and lead to tremendous cost savings in wildfire suppression efforts.

The Western Regional Risk Report aims to explore and characterize strategies that stakeholders, communities, agencies and all partners can use to address the three goals. The maps and charts in this document give us a generalized picture across the entire region, while identifying existing biophysical and social conditions and relationships among factors. The analysis shows us where fires are occurring, where future fires are likely to occur, and where we might be able to intervene with mitigation efforts to reduce fuels to reduce the severity of future fires. The landscape needs active management to reduce fuels in order to reduce losses of homes, lives, and resources to wildfire. Experience with fuels treatment projects has demonstrated the value of fuels reduction to reduce suppression costs and protect land and resources, and the importance of collaborative groups, which bring a variety of stakeholders to the table to forge agreements on how to restore landscapes and reduce wildfire risk.

The risk analysis in this report summarizes three alternatives in relation to the three Cohesive Strategy goals and social, economic, and ecological conditions. This Phase III effort builds on the Phase II *Western Regional Assessment and Strategy Report*. The National Science Analysis Team has assembled a library of data and tools that can be used to inform decision-makers in making land management choices.

As part of the Cohesive Strategy planning process, the Western Regional Strategy Committee reviewed and analyzed the data to refine Alternatives 1, 2 and 3, which represent three different focus areas to address in the future development of specific Action Plans. Like the three goals, the three alternatives are not mutually exclusive. Resilient landscapes, fire adapted communities, and improved fire response work together to mitigate the risk of wildfire. There is no one preferred alternative to be applied across the West. Rather, the three alternatives present investment options that are believed to offer the greatest positive impact. The value of employing a blend of the goals and alternatives has applicability across the vast geographic landscape of the West.

- Alternative #1 emphasizes landscape resiliency and recommends activities that contribute to improvements in forest and rangeland health.
- Alternative #2 emphasizes fire-adapted communities in which all stakeholders and affected publics are collaboratively engaged in protecting communities and WUI residents from wildland fire and in fulfilling a stewardship role for their surrounding landscape.
- Alternative #3 emphasizes increased stakeholder effectiveness in risk-based wildland fire response that enhances the effectiveness of firefighter and public safety.

## Recommendations

Following from the alternatives are recommendations to address each alternative, plus overarching recommendations that address all facets of the Cohesive Strategy. The following recommendations are broad based.

### Overarching Recommendations

- Recognize the depth and importance of the communications framework and provide resources to implement communications recommendations, as it establishes the foundation of our collaborative process.
- Ensure the coordinated implementation of the Cohesive Strategy among all stakeholders.
- Enhance collaboration through incentives.
- Emphasize landscape treatments where existing collaborative groups have agreed in principle on management objectives and areas for treatment, and encourage and facilitate the establishment of collaborative groups.
- Expand collaborative land management, community and fire response opportunities across all jurisdictions, and invest in programmatic actions and activities that can be facilitated by Tribes and partners under the Indian Self-Determination and Education Act (as amended), the Tribal Forest Protection Act, and other existing authorities in coordination with the UN Declaration on the Rights of Indigenous Peoples.
- Address identified barriers and promote critical success factors across the region and at all levels.
- Provide resources to support local government officials, such as fire chiefs, in the integration of the Cohesive Strategy into their communities and operations – i.e., support the development of an International Association of Fire Chiefs (IAFC) Leaders' Guide for the Cohesive Strategy.
- Formalize a comparative risk model that includes federal, state, and local costs. Use the model to complete a trade off analysis and establish a risk base point.
- Establish the use of the model, including training and data descriptions for local decision makers, such as counties. Facilitate local updates to the models to enable updates to the national models.
- Identify data gaps and inconsistencies, including describing the purpose of the data in monitoring and evaluating progress to accomplishing the goals of the Cohesive Strategy. Prioritize action toward addressing gaps and inconsistencies.

### Landscape Resiliency Recommendations

- Encourage US Forest Service and Department of the Interior/Bureau of Land Management to use existing authorities under Healthy Forest Restoration Act, Healthy Forest Initiative, and other contracting authorities to expedite fuels treatments. Assess what is currently being spent on these tools and increase that amount. Project criteria to be worked out during action planning may include: Project has to be 5,000 acres or larger, reduces risk to landscapes and/or communities by focusing on areas that have a high burn probability or departure; has to be initiated within 2 years; and is based on collaborative processes.
- Explore data to identify and prioritize landscapes for treatment. This information would be provided to sub-geographical stakeholders, decision makers, as well as state and federal officials for their consideration and use.
- Expedite coordinated identification, prioritization, and restoration of damaged landscapes as a result of natural disturbances including, insect/disease, hurricanes, wildfire, invasives, changing climatic conditions. Identify where investments are not likely to restore areas to assist in prioritization of resources.
- Work with Council on Environmental Quality (CEQ) in developing categorical exclusions for landscape restoration.
- Where appropriate, utilize CEQ alternative arrangements when restoring damaged landscapes as a result of natural disturbances.



- Examine legislative related barriers that are impeding implementation of collaboratively developed landscape health related projects and pursue reform of the existing process to increase our effectiveness in active forest and rangeland management. (e.g., Endangered Species Act, Equal Access to Justice Act, National Environmental Policy Act (NEPA)). Encourage and enlist local, state, tribal, and federal environmental regulatory agency representatives to participate actively in collaborative efforts to restore resilient landscapes.

### *Fire Adapted Communities Recommendations*

- Accelerate achievement of fire adapted communities using existing tools; offer incentives, such as chipping/disposal and incentives for collaboration, etc.
- Enhance campaigns to educate the public about the urgent need for homeowners to take action, including having statewide, Western, and other coordinated campaigns. Use videos such as how to protect homes from fire, the importance of fire in nature, and the need to live with fire.
- Facilitate shared learning among communities for fire adaptation.
- Continue to create and update Community Wildfire Protection Plans (CWPPs) using Secure Rural Schools Community Self-Determination Act and identify new funding sources. Be sure to include offices of emergency management and local response entities, such as the sheriff's office in planning efforts. Update CWPPs in areas that have had a wildfire event.
- Review and modify requirements for technical and financial support of communities through Federal Emergency Management Agency (FEMA), i.e. NEPA administrative processes, and applications for funding.
- Develop and promote local collaborative capacities to implement fuels treatments and respond to fires.

### *Fire Response Recommendations*

- Improve response effectiveness by convening state level groups to identify where fire protection exists for all areas within each state. Eliminate unprotected areas by establishing/extending jurisdictional responsibilities. Response cooperators in each state should identify those voids and negotiate to ensure that every acre within the state has designated protection. Promote realignment of protection responsibilities to the organization that is best suited to provide protection (e.g., block protection areas, offset protection agreements, protection contracts).
- Improve firefighter and public safety. Maintain and/or improve an aggressive human caused ignition prevention program. Involve all stakeholders in the prevention campaign.
- Integrate local, state, federal, and tribal response capacity. Identify where the greatest opportunities exist in communications, training, qualifications, mobilization, and instruments.
- Increase capacity where necessary in order to improve overall local response effectiveness and reduce the need for external (non-local) resources.

## **Next Steps**

The Western Region will use the Phase III report in conjunction with the objectives outlined in the Phase II report, *A National Cohesive Wildland Fire Management Strategy: Western Regional Assessment and Strategy* to develop a Regional Action Plan that addresses the needs of landscapes, communities at risk, and fire response. The Action Plan will be developed with stakeholder input, in an inclusive and transparent process, and will be completed in early 2013.

Experience has shown us that collaboration does not spontaneously happen. It requires structure, process, focus, and resources. To that end, the next step for the Western Region is to establish a coordination structure that will exist under the umbrella of the Wildland Fire Executive Council (WFEC). This structure will facilitate the broad scale implementation of the recommendations identified in the Western Regional Risk Report.

It is envisioned that the structure will be a coordinating body, composed of representatives of the decision-making and jurisdictional authorities in the West. This regional coordinating body will need

resources, a full-time staff lead, and a communications component. It is recommended that these resources be acquired through new or existing agreements with the Western Governors' Association and/or Western Forestry Leadership Coalition. The objective of the coordinating body will be to facilitate the development of the action plan and its implementation, provide consistent communications with stakeholders, and foster true collaboration.

## Introduction

---

The National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) is a bold, new national approach to the increasingly complex reality of wildland fire and land management, and fire response. The Cohesive Strategy is being developed in response to a mandate under the Federal Land Assistance and Management and Enhancement Act (FLAME Act). The Cohesive Strategy was developed in response to growing concern over mounting annual costs of fighting wildfires, devastating wildland fire losses to communities, and concern about overall landscape health. The Cohesive Strategy recognizes that fire is a natural process, necessary for the survival of many ecosystems, and focuses on attempting to reduce the conflict between fireprone landscapes and people. The Cohesive Strategy takes a holistic approach by simultaneously looking at the role of fire in the landscape, the ability of humans to actively manage these landscapes, plan for and adapt to living with fire, and the need to be prepared to respond to fire when it occurs.

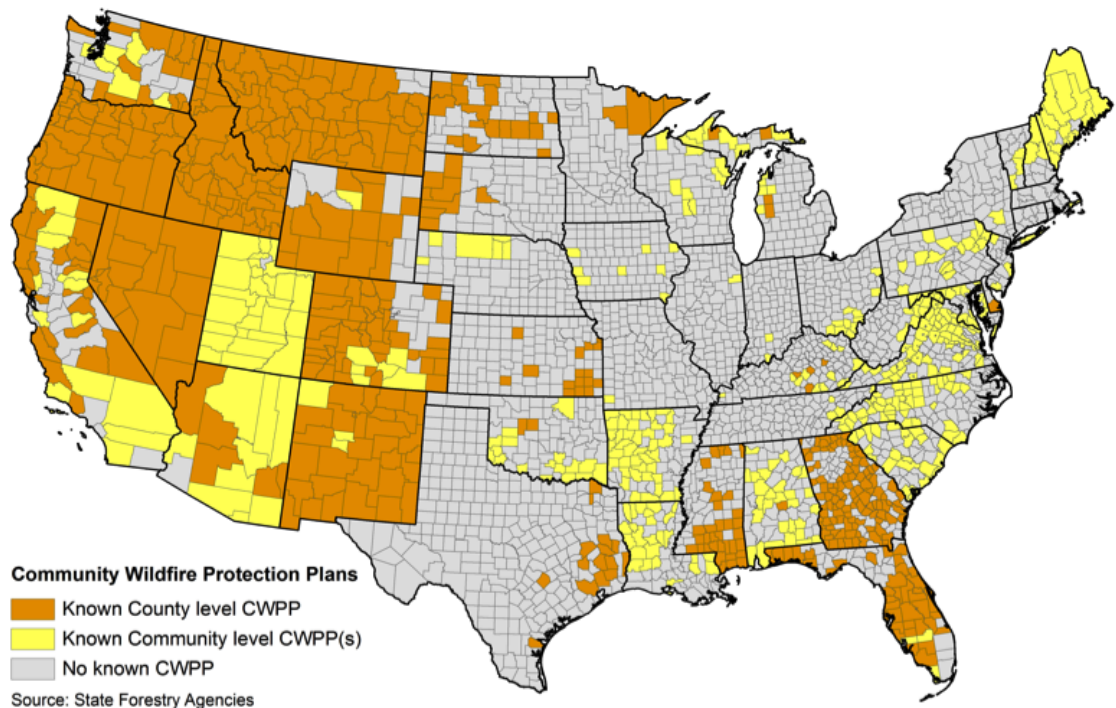
The Cohesive Strategy brings together representatives of the many stakeholders – federal and state land management agencies, local governments, landowners, environmental groups, tribal groups, fire professionals, and non-governmental organizations and other entities, to discuss goals and work collaboratively to develop shared objectives. The top-down, bottom-up approach of the Cohesive Strategy brings local knowledge about landscapes and fire to the highest levels of decision-making. And it brings together natural and social scientists to employ a scientific model to inform the deliberations with the best available science, designed to help determine the best path forward in addressing the complex issues relating to wildland fire. Working through regional strategy committees representing the three distinct regions of the country – the Northeast, the Southeast, and the West- these groups are devising a shared strategy that will inform decision-making to best use our ecological, social, and economic resources in preparing for, responding to, and recovering after inevitable wildland fires.

The Cohesive Strategy takes an “all lands” view of wildland fire management. Fire knows no political or social boundaries – not ownership boundaries, not state boundaries. Policymakers must take a landscape-level approach and work across boundary lines to implement effective management techniques. And, it is important to include all the stakeholders to reach decisions that are supported by the community at large. The Cohesive Strategy solicited feedback from a wide variety of stakeholders and used their feedback to help develop alternatives. The Cohesive Strategy is unprecedented in its effort to initiate dialogue and effect collaboration on a national scale.

Annual fire suppression and preparedness costs are high. In 2003, the cost of suppression to the federal government was \$1.7 billion. In 2008, state and local governments spent over \$1.6 billion on suppression and wildland fire mitigation. However, according to the recent study, *The True Cost of Wildfire in the Western United States*, by the Western Forestry Leadership Coalition, fire suppression costs are only a small portion of the true costs of a wildfire event. There are many costs borne by individuals that extend far beyond the scope of fire suppression. Direct costs reflect the cost of suppression, but the following costs are generally not included in direct cost estimates: rehabilitation costs, post-fire flooding, and watershed degradation costs. Other costs that go unaccounted for are indirect costs, such as lost tax revenues, business revenues, and property losses. And additional costs including loss of human life, ongoing health problems for the young, old, those with weak respiratory and immune systems, and mental health issues are also not included in estimates. A synthesis of six case studies in the report reveals a range of total wildfire costs anywhere from 2 to 30 times greater than the reported suppression costs (WFLC, 2010).

The National Fire Plan of 2001 began a strong effort to reduce losses to communities from wildland fire. In the twelve years since the inception of the National Fire plan, state and federal agencies, local government, the private sector, communities, tribes, and non-governmental organizations (NGOs) have worked diligently to improve the conditions of the lands, make communities fire safe, and develop a strong fire response capability.

One of the strengths of work done under the National Fire Plan and the 10-Year Implementation Strategy was the development of Community Wildfire Protection Plans (CWPPs) for communities at risk throughout the country. CWPPs are planning documents developed at the local level by community members working together to assess the risk to their community or county, and develop mechanisms to reduce risk, including: education of residents, reducing fuels around structures, identifying methods to reduce structural ignitability, and prioritizing fuels treatments in and around the community or county. The map below shows the geographic areas that have CWPPs today, at either the county or community level.



**Figure 1. Counties that have CWPPs or community CWPPs within them.**

Source: State Forestry Agencies

Large areas of the West have at least one CWPP within each county. This shows both the commitment of the Western states, counties and communities to take action to do what they can to reduce wildfire risk, and it also illustrates the need to further the extent of this work to all areas affected by wildfire risk.

Under the National Fire Plan, a lot of very good work was done, but some stakeholders say there is room for improvement. One concern expressed by stakeholders is that fuels treatments, community protection planning, and fire response efforts were led by separate agencies or groups, and not coordinated with the actions being done by other agencies or groups. This is sometimes referred to as “stove piping” within agencies.

The Cohesive Strategy brings the stakeholders together to form partnerships and to weave these separate pieces together. In doing so everyone benefits by gaining leverage, efficiencies, and reduced risk. Previous collaborative efforts highlight the need for shared responsibilities, effective partnerships, improved interagency coordination and response, and active land management. They create an imperative for a new direction in expectations for federal, state, tribal, and local wildland fire protection agencies



and organizations to address our nation's wildland fire problems in a more efficient way. An increased level of collaboration has developed among stakeholders that will carry into the implementation stage.

This report will summarize the work done in the Western region during Phase III of the Cohesive Strategy. Decisions from Phase I and Phase II will be briefly described in this report. More information on Phases II and I can be found on the website, [www.forestsandrangelands.gov](http://www.forestsandrangelands.gov), including all the Phase I and Phase II reports and foundational national documents.

## Three Phases of the Cohesive Strategy

The Cohesive Strategy has been developed in three phases. In Phase I, stakeholders met to develop national goals and performance measures, and agree upon the guiding principles of the Cohesive Strategy. Forums were held throughout the country to learn the values, objectives, perceived barriers and desired actions of the stakeholders. Phase I also created a framework under which the three regions would create individual assessments and strategies tailored to their unique, regional needs. In Phase II, diverse groups of stakeholders representing each of the three regions met independently, identifying regional challenges and opportunities as well as key priorities. They agreed upon regional goals, which for the most part are the same as the national goals. The regions focused on how the processes of wildland fire, or the absence of fire, affect their values-at-risk. In Phase II, the Western region articulated its broad objectives and actions required to achieve those objectives. The size, scope, amount of federal land, and diversity of the landscapes in the West were identified as key components that make the West unique. Immediate opportunities for success were identified. Phase III serves as the conclusion of the planning period of the Cohesive Strategy, during which the scientific analysis and risk assessment are added to the goals and objectives. In this phase, alternatives for emphasis and action plans will be developed as we approach the implementation phase.

## Core Values and Vision for the Future

The Cohesive Strategy is built on several principles and values, including engaging stakeholders, managers, and scientists; using the best available science, knowledge, and experience; and emphasizing partnerships and collaboration. The Cohesive Strategy sets out a vision and actions for the future of wildland fire management.

The vision for the next century is to: “Safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, live with wildland fire.”

## Guiding Principles

The following guiding principles were crafted through discussions with federal, state, tribal, and local governmental and non-governmental organizational representatives in Phase I. Stakeholder input received during Phase I forums was used in developing the guiding principles, which are an overarching set of principles that apply to all stakeholders in the wildland fire management community. The guiding principles apply to the different elements of the strategy: resilient landscapes, fire-adapted communities, and wildfire response. These guiding principles and core values were developed at the national level and were also adopted by the three regions as the regional guiding principles:

- Reducing risk to firefighters and the public is the first priority in every fire management activity.
- Sound risk management is the foundation for all management activities.
- Actively manage the land to make it more resilient to disturbance, in accordance with management objectives.
- Improve and sustain both community and individual responsibilities to prepare for, respond to and recover from wildfire through capacity-building activities.
- Rigorous wildfire prevention programs are supported across all jurisdictions.
- Wildland fire, as an essential ecological process and natural change agent, may be incorporated into the planning process and wildfire response.

- Fire management decisions are based on the best available science, knowledge, and experience, and used to evaluate risk versus gain.
- Federal, local, state, and tribal governments support one another with wildfire response. They engage in collaborative planning and the decision-making processes that take into account all lands and recognize the interdependence and statutory responsibilities among jurisdictions.
- Where land and resource management objectives differ, prudent and safe actions must be taken through collaborative fire planning and suppression response to keep unwanted wildfires from spreading to adjacent jurisdictions.
- Safe, aggressive initial attack is often the best suppression strategy to keep unwanted wildfires small and cost down.
- Wildland fire management programs and activities are economically viable and commensurate with values to be protected, land and resource management objectives, and social and environmental quality consideration.

## The Three National Goals

Three factors were identified as the primary focus areas for the Cohesive Strategy. They are: restoring and maintaining resilient landscapes, creating fire adapted communities, and responding to wildfires. Flowing from the guiding principles and core values, and focusing on the three factors, three national goals were adopted in Phase I. The three national goals are:

- Restore and Maintain Landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- Fire-Adapted Communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.
- Wildfire Response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

In Phase II of the Cohesive Strategy, each of the regions adopted these goals and used them to define objectives, actions, and preliminary alternatives for implementation.

## Stakeholder Engagement

Stakeholder involvement forms the foundation of the National Cohesive Wildland Fire Management Strategy. The Western Regional Strategy Committee has worked toward inclusiveness and transparency to further understanding and involvement among shared interests. Stakeholder input received during forums and comment periods has outlined the objectives, values, barriers and actions to address wildland fire management issues in the 17 Western states that form the Western Region. Additionally, stakeholder input was used to create the national and regional guiding principles and areas of concern for the development of the Phase II assessment. In the future, it is expected public comment will continue to shape the direction of the strategy in the West. A complete description of outreach and comments can be found in Appendices 5 and 6 of this report.

The public involvement process used to plan fuels management projects varies greatly among federal, state, tribal and local lands, affecting each agency's ability to implement on-the-ground treatments in a timely manner. State, local and tribal leadership is important in land use issues for most of the private land in the West as it affects the extent and growth of the WUI, adoption of fire-adapted communities and building codes, development and concurrence of Community Wildfire Protection Plans (CWPPs), local volunteer and professional response to fire and all-risk incidents, support of collaborative efforts, and the viability of fuel reduction and larger landscape restoration projects. Engaging elected officials at multiple levels is critical to success.

## Collaboration Focus of the Cohesive Strategy

The foundation of the Cohesive Strategy is collaboration. The Western Governors' Association Forest Health Advisory Committee, found that landscape-scale forest restoration must be supported by meaningful, ongoing collaboration that serves to accelerate the restoration process in a socially, ecologically

and economically viable fashion. The more inclusive the group and the greater the diversity of interests involved, the more likely it is to be representative of the community as a whole and to find broadly acceptable, mutually agreeable solutions. Such collaboration can help identify areas of the greatest need, focus treatments for maximum benefit, increase participation in management decisions, and provide for more opportunities to reach agreement on management practices. Collaborators should define restoration of forest health for their area. This will help identify a “zone of agreement” that will avoid the gridlock challenging many public lands management initiatives. The Western Region’s strategy is in agreement with the Western Governors’ Association. Landscape treatments should be emphasized in areas where existing collaborative groups have agreed in principle on management objectives and areas for treatment. New collaborative groups should be encouraged and facilitated for future involvement in active management of the landscape.

## Phase III is not the End but a Beginning

The publication of the Phase III report is not the end of the Cohesive Strategy process. Immediately following the release of this report, the WRSC will begin developing an action plan with stakeholder involvement to be completed in early 2013. Implementation of the strategy by the diverse partners that have been involved in its development will continue in the decisions that are made, informed by a scientific method, to effectively prepare for, utilize and respond to wildland fire.

Phase III of the Cohesive Strategy represents the first time that datasets from the various land and fire management agencies, NGO’s, and the private sector have been brought together to create one tool that can be employed to identify key factors, issues and risks that affect wildland fire management across the nation. This robust new tool for landscape, social and fire analysis will continue to be used into the future.

The scientific model will continue to be refined and a trade-off analysis process will be developed at the national level. This will be contained in the National Risk Analysis Report to be finished in 2013, and a National Action Plan will describe actions for implementation of the Cohesive Strategy at the national level, and will be completed before the end of 2013.

These developments may have some impact on the regional analysis and the action plan in the future; updating will be a continuous process as new information is received by the WRSC.

## Data and Methods for Exploring Opportunities to Reduce Risk

### Introduction

Wildland fire is a complex issue that involves multiple interacting factors spanning the natural, human, and built environments. During Phase II of the Cohesive Strategy, the National Science Analysis Team (NSAT) examined various aspects of wildland fire and developed conceptual models specific to each component. The purpose of these models was to display the interactions and relationships among factors that may influence risk, such as the relationship between fuel treatments and the extent and intensity of wildfire. The NSAT also identified various data sets that might be used in Phase III to build analytical models consistent with the concepts articulated in Phase II. Building on these efforts, Phase III has involved an extensive effort to collect data necessary to quantify relationships and provide the ability to rigorously examine wildland fire and risk.

The types of data collected can be broadly categorized into five general types: biophysical, socioeconomic, land-use and ownership, wildfire frequency and extent, and incident response. Biophysical variables include physical measures such as precipitation, temperature, and terrain. They also include characteristics of vegetation that contribute to wildfire behavior. Socioeconomic variables describe the demographic and economic characteristics of populations and communities within each county, and also describe the distribution of homes within the wildland-urban interface. Land-use and ownership describes the mixture of public and private lands and also helps quantify the extent to which lands might be suitable for active management, e.g., by highlighting areas that historically supported timber harvest.



Variables describing wildfire frequency and extent have been gathered from various reporting systems that have been put in place by federal, state, and local fire departments (See Appendix 4). They also include data from independent monitoring systems that track wildfire using satellites and other remote devices. Finally, they include a series of modeled products from governmental and private entities. Similarly, incident response information has been gathered from many of the same reporting systems. These variables track that responded to wildfire, how long they took to arrive on site, and how long was required before the fire was contained. Information on injuries and casualties can also be found in these same reporting systems. All of the variables available for use in the Phase III analysis are listed in Appendix 4.

While the data sets included in this analysis represent the most comprehensive national wildland fire related information assembled at the county level to date, each individual data set has recognized shortcomings. Recommendations from the analysis include prioritizing data gaps and further analysis. Each layer of information comes from an organization that has collected and maintains the data. Improvements in the base data sets would involve action by the organization that is the custodian of the data.

Before data were used in analysis, three additional steps were accomplished. The first step was one of quality control to eliminate obvious errors. The second step involved compiling, reformatting, or summarizing data to fit within a common sampling frame—the county including processing higher resolution data into county level summaries and normalizing for comparative purposes. The third step in data preparation involved filtering and consolidation using statistical techniques – reducing the total number of variables considered by nearly two thirds.

## Modeling

Various analytical models were constructed for the primary purpose of relating causal or contributing factors to variables, which collectively index levels of risk. Many of the analytical models used in our analysis were constructed using Bayesian networks. Bayesian networks are decision analysis tools that use conditional probabilities to link variables together and express the degree of relationship between them.

Five basic models or templates were created for use in the Western analysis to explore opportunities for reducing risk.

- Ignition Model - focused on understanding where human-caused wildfire ignitions occurred and where they might be reduced through targeted actions at preventing either accidental or intentional ignitions alone or in combination.
- Fire, Fuels, and Homes—explored the intersection of homes and wildfire and included variables that might suggest where either mechanical treatments and/or prescribed fire might be productively employed to alter the composition of surface fuels and affect wildfire behavior.
- Prescribed Fire and Ecological Resiliency—focused more on the potential application of prescribed fire in areas removed from human communities where the primary goal might be to restore a fire regime more consistent with historical conditions.
- Fire Adapted Communities – used information about current programs to suggest the extent to which evidence of local actions are tied to socioeconomic factors as well as to factors more directly indicative of risk to human communities from wildfire.
- Incident Response Capacity and Workload – used information about the relative contribution of federal, state, and local departments to incident response and factors contributing to variation in response metrics such as arrival and containment time and fire size.

These templates and associated data were customized for the Western analysis. Through a series of interaction with the Western RSC and technical team a series of summary tables, graphs, and maps were developed that highlighted findings relevant to objectives and goals articulated by each region. Many of these summary products and maps have been incorporated in the Western report. The data and models create a rich opportunity to further examine options for reducing risk beyond the work summarized in this report. The variables and data sets will be important in the development of the National Risk Analysis and the trade-off analysis.

## Data Gaps

The extensive data assembled for the Cohesive Strategy process revealed relationships among factors that influence risk but also revealed data gaps. This section addresses incomplete, inaccurate, and missing information. The all lands approach revealed that some jurisdictions maintain data that is not available on other jurisdictions, that some data elements are inconsistently reported, and some data elements are not required for each reported incident.

No effort is made here to prioritize the data gaps by any specific criteria. In some instances there are efforts underway to remedy the recognized gaps while in other instances no current efforts are being made to address them. The recognized data gaps include:

- No consistent record of standing fuels from previously burned areas
- Limited spatial information on beetle kill areas across all ownerships
- Inconsistent and missing information on ignitions and fire across all ownerships – some jurisdictions have substantial records but when all jurisdictions are considered there are inconsistencies in reporting spatial, temporal, and fire characteristics
- Cost and spatial information on investments across all jurisdictions is inconsistently available – fuels treatments, mitigation actions, prevention efforts, response resources, and assets available for suppression
- Spatial information on unprotected lands and spatial information on protection assignments spatially
- Fuels treatment effectiveness monitoring data
- Litigation on treatment proposals
- Specifics on use of Categorical Exclusions and Environmental Assessments
- Specific communities that have adopted ordinances in response to fire risk and specific communities that have prepared and are implementing CWPPs
- The number, location, and size of fires that provide resource benefits
- Location and number of homes and structures burned in wildfire
- Spatial information on smoke extent, duration, and drift
- Specific watershed conditions with respect to resiliency
- Spatial information on high value areas and the extent fire influences values
- Across all ownerships – response capacity and resources – numbers and costs
- A lack of information on fuels, fire occurrence, values at risk, response, preparedness, community wildfire protection activities, and prevention activities in Alaska and the Pacific Islands.

Some information is important from a monitoring perspective to understand how risk changes through time and under varying management activities while other information is important to understand fundamental values at risk. The Cohesive Strategy process has been valuable in recognizing the importance of information across all ownerships and how inconsistencies complicate the ability to better inform decision-making at all levels.

## The Risk Analysis

---

### Wildland Fire is an Important Western Issue

Fire is a natural process and a mechanism for biological renewal across forest and rangeland ecosystems. In the Western United States, a century of widespread fire exclusion and the more recent severe reduction of active forest management, have resulted in a build-up of surface fuels (downed wood, litter and duff) and the overstocking of forests with trees and ladder fuels. Those conditions, exacerbated by other stressors such as drought; insects and disease; invasive species; and changing climate conditions have led to uncharacteristically large, severe, and costly wildfires that threaten homes, communities, and cultural and resource values, and can cause widespread property and environmental damage. These environmental conditions along with the effects of an expanding wildland urban interface underlie four broad areas of risk: risk to firefighters and civilian safety, ecological risks, social risks, and economic

risks. Air quality, water quality/quantity, sensitive species, natural and cultural resources, as well as human communities and associated values, are all at risk. Ignitions, fuels, insects, disease, terrain, climate change, responder availability, ecological departure, and other factors all contribute to such risk.

Managing wildfires in the West is becoming increasingly complex and consumes the majority of suppression dollars spent nationally. The influence of human community development and particularly, the more recent expansions of the WUI areas, contribute to challenges of wildland fire management and suppression. While significant interagency and interstate efforts have been made over the past decades to facilitate cross-boundary work, important issues regarding risk to communities, fire protection services, the ability to use wildland fire as a management tool, and smoke management and air quality continue to be raised, posing prevention and mitigation problems for the foreseeable future.

## Wildland Fire Varies Across the Landscape

Fire behavior differs by region due to the type of vegetative fuels, topography, and climate. Trees, shrubs and grasses (both live and dead) all provide fuel for fires. Wildland fire management varies significantly based on jurisdictional mission, proximity to communities and values to be protected, and the potential for fire to spread onto jurisdictions with different ownerships, missions, and management responsibilities. The WUI includes all places where forests and human communities are next to or intermingled with each other. The WUI is not limited to forested areas. Land areas dominated by grasses and shrubs are also WUI, and may pose significant wildfire risk to neighboring communities. People who live in areas prone to fire need to be aware of the risk and prepare their homes and property for wildland fire events. While many areas have paid or voluntary fire departments, there are also areas of the country, particularly large areas of the West, which are unprotected or under protected from fire.

## Landscape Management Can Reduce Wildfire Severity

Wildfire is natural and occurs at fairly regular return intervals that vary across the landscape. For example, historically, some areas have seven year fire return intervals, while others have 100-year return intervals, or longer. When these natural fires are suppressed, it allows more surface fuels to build up between fires, which makes it more difficult and more expensive to suppress the next fire. Suppressing all fires has the inevitable outcome of larger, more dangerous fires in the future. Through active management of our forests and rangelands, reducing fuels by either prescribed fire or mechanical means, the severity of future fires can be reduced. Active management of the landscape reduces the fuel for a wildfire, which reduces flame lengths and fire behavior, which in turn can reduce the potential impact of wildland fire on communities. Reducing the fuels near communities and preparing the area residents' homes to better withstand the inevitable fires through the creation of defensible space and use of fire resistant building materials can allow communities to reduce structural losses and reduce deaths or injuries.

There are vast expanses of federal lands and wilderness areas where access is extremely limited and distances to communities and community values to be protected are great. In these areas, where limited access, travel times, communication difficulties, and other factors simply place firefighters at too much risk, wildland fire management may focus on achieving ecological objectives rather than a suppression response. On these lands, fire may be included intentionally as a natural landscape component and change agent to achieve multiple objectives. There are also large expanses of land that are sparsely populated and have limited wildland fire response capability, frequently resulting in slower response times and escaped initial attack fires. Rugged topography can create natural access difficulties, further impacting response times and options, and in many cases contributing to larger and longer duration wildfires, threatening communities and community values to be protected. These challenges are compounded due to much of the West being arid and semi-arid, with long natural disturbance recovery times that, in some cases exceed one hundred years. The non-full-suppression objectives described above routinely pose challenges in mixed ownership areas and require pre-planning and collaboration to reduce objective and value-based conflicts, including recreation, timber, forage, tourism values and the potential of transferring risk and costs to neighboring landowners.



## Addressing the Middle Ground

People of the West are concerned about more than just the physical structure of their communities. In the stakeholder input process, the tribes and local residents made it clear that the “middle ground” or “middle lands” also require protection and management. “Middle lands” are those nearby areas that contribute to the identity, structure, culture, organization, and wellbeing of a community, and are often considered essential to its economic, social, and ecological viability. The middle ground contains many values at risk such as watersheds, viewsheds, evacuation routes, private forests, wildlife habitat, utility corridors, cultural grounds and more. Middle ground areas can be included in CWPPs for prioritization in active management of WUI areas. Tribal members and partners often describe the community as the “home” and the surrounding middle lands as the “homeland”. The landscape is an integral part of the community, and the community is part of the landscape. The tribes’ knowledge that they have handed down about the country’s landscapes and natural resources, along with their ethic of stewardship of the land, are invaluable assets that can be incorporated in the Cohesive Strategy.

## The Management Alternatives

---

This report examines wildland fire-related challenges and identifies opportunities managers at any level can use within the Western region. Three discrete alternatives are delineated. Each of the three alternatives combines important elements to address all three goals. However, each alternative has a single goal, which it emphasizes: resilient landscapes, fire adapted communities, and response to wildfire. The alternatives were developed early in Phase III and considered stakeholder feedback and informed data to address risk in each goal area. The alternatives are not mutually exclusive, and there is no one preferred alternative to be applied across the West. Rather, the emphasized alternatives present investment options that are believed to offer the greatest positive impact. They will need to be balanced to achieve strategic goals and implement effective wildland fire management.

The strategy is designed to be responsive to the specific needs of each geographic area, based on consideration of relevant biophysical, social and economic information at the county level. When local decisions need to be made, a more detailed study of the specific area will necessarily be part of the decision making process.

The appropriate blend of goals and alternatives should be determined locally, depending on the local conditions being addressed. For instance, in some areas, an emphasis on restoring and actively managing landscapes might be the preferred alternative to create the wanted desired future condition, but fire response would still be a necessary element of the area’s strategy, as would be work toward creating fire adapted communities. Conversely, other areas might need more emphasis placed on the creation of fire adapted communities. As one thinks and works through the possibilities of different alternatives, options, and actions, it is quickly recognized that greater emphasis needs to be placed on all three goals and the alternatives docked underneath them.

Alternatives neither identify specific implementation actions (i.e. who will do what, where, how, and when), nor specific process actions. However, it is expected that the analysis will inform specific actions the region may wish to pursue. Those specific actions will be developed in the Regional Action Plan to be accomplished in the near future.

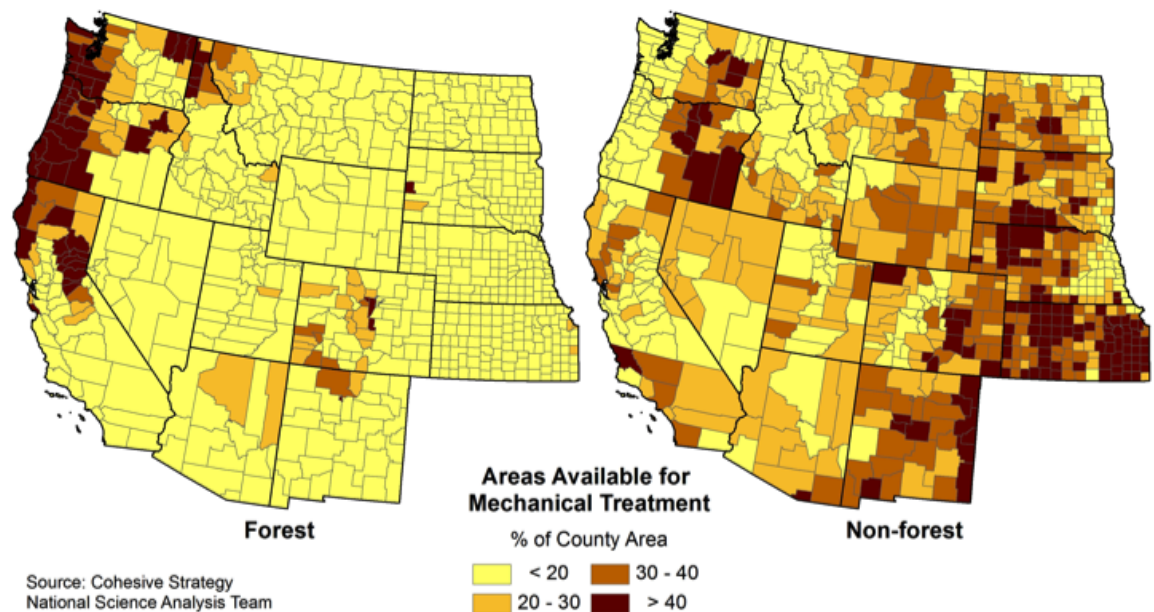
### Alternative #1: Landscape Resiliency

Alternative #1 emphasizes landscape resiliency and recommends activities that contribute to improvements in forest and rangeland health. This alternative uses active management to accomplish landscape resiliency through a variety of different management tools including mechanical, prescribed fire and other treatments. Much of the work to impact landscape resiliency will occur within the middle lands through active forest, rangeland and fuels management. Treatments in wilderness will occur through wildfires and prescribed fires, while other special land use designations may use a suite of

appropriate options. The outcome of more actively managing the landscapes in the West will have positive benefits for all three goals of the Cohesive Strategy. The middle lands are especially important, when considering the spatial extent of many large wildfires and rapid rates of spread that directly impact fire adapted communities, as well as the adverse impacts on private timber and grazing lands, natural resources, cultural and watershed resources that support these communities. A cohesive strategy must ensure that commitments to collaborative efforts and partnerships that have developed in treating areas outside of the WUI are maintained. Over time this alternative significantly reduces/modifies the impacts of wildfire, the level of required response, and helps to protect fire adapted communities.

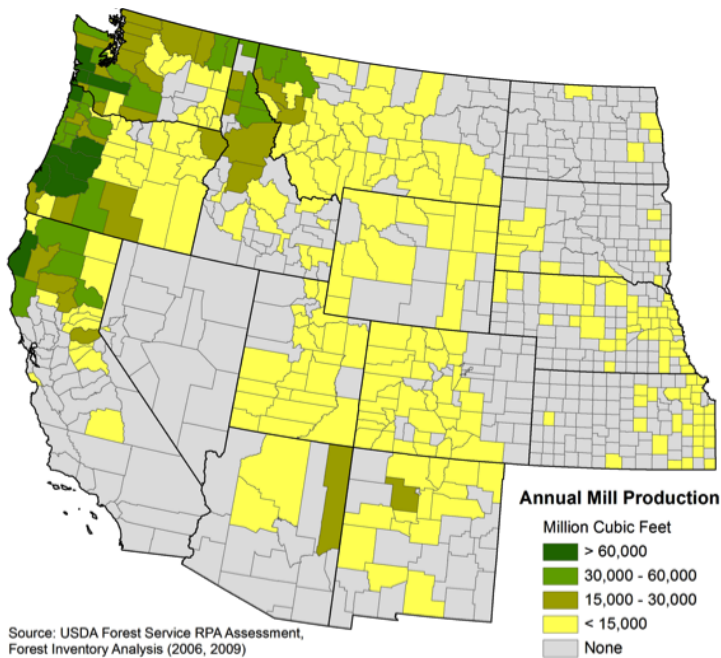
### Focus areas:

1. Provides for collaborative fuels and prescribed fire strategies for the restoration and maintenance of resilient forest and rangelands through active management.
  - a. Employ a variety of vegetation management applications and treatments through mechanical treatments, grazing, prescribed fire and cultural fires, natural fires, and any other combination of tools that may be appropriate for a given geographic region or fuel type in the West. Management options and treatments are located to protect values at risk and implemented at a landscape scale, especially in areas with a history of large wildfire occurrence.
  - b. Enable land owners/managers to develop and implement more appropriate actions to achieve healthy and resilient forest and rangeland landscapes.
  - c. Emphasize vegetation treatment projects with a positive net revenue that will improve vegetative landscapes to the largest extent possible.
  - d. Prioritize treatments geographically by existing forest and range conditions and by opportunities to stimulate local and regional economic activity.



**Figure 2. Areas Available for Mechanical Treatment**

The percent of county area generally available for mechanical treatment - for forested (left) and non-forested (right) burnable fuels - based on legal or policy restrictions, slope, accessibility and land cover. The map does not reflect the availability of markets or capacity to plan and conduct treatments.

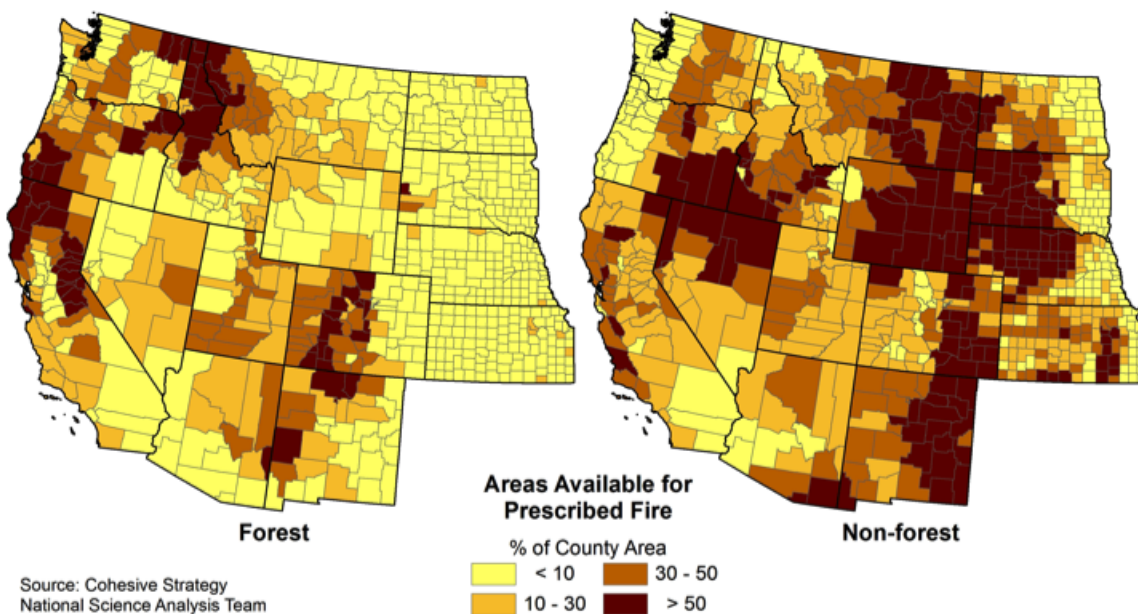


**Figure 3. Annual Mill Production**  
Annual forest products produced by mills.

Mechanical fuels treatment can be used as one tool to protect, maintain, and restore landscapes. Mechanical fuels treatments can also provide side benefits of local employment, and revenues to offset the cost of treatments. Within the West, there are areas with the infrastructure in place and markets for biomass that will facilitate landscape scales treatments. Conversely, there are large portions of the West that lack the infrastructure and biomass markets, which reduces the capability of these areas to conduct mechanical treatments on a large scale. These maps provide a general description of where mechanized treatments could be an option to reduce risks.

e. Utilize prescribed fire where and when appropriate to

enhance landscape restoration and simulate natural disturbance or historic fire regimes.



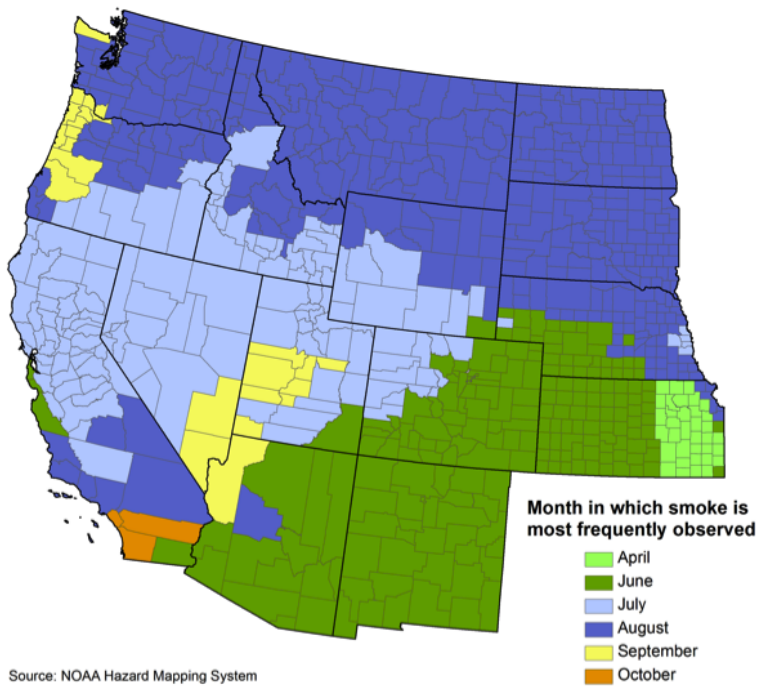
**Figure 4. Areas Available for Prescribed Fire**  
Western counties categorized by the percent of the area within each county that is generally available for prescribed fire that are forested (left) and burnable non-forest (right) based on historic fire regime groups 1-4 and a filter removing urban, agricultural and mixed land use cover types. These do not reflect local restrictions or workforce capacity. There are significant forested areas in the west where prescribed fire potential exists to treat fuels, reduce fire risk, and improve landscape resilience. Prescribed fire opportunities are more likely to exist in the forest and non-forest environments in the highlighted counties.

Prescribed fire treatments can also be used as a tool to protect, maintain, and restore landscapes. Within this focus area, these maps provide a general description of where prescribed fire treatments could be an option to reduce risks.

- f. Consider opportunities for wildland fire use for resource benefit and balanced with considerations of values at risk, transference of risk, and aggressive wildland fire suppression.
  - g. When conditions have experienced significant historical departure, hazardous fuels treatments will often be required within altered fire regimes before appropriate ecological responses can occur under wildfire response strategies to achieve resources objectives.
  - h. Appropriate landscape restoration and maintenance treatments can preserve or enhance important habitats and diminish threats to these habitats.
2. **Ecological Health- leverage collaborative efforts and actions to focus on lands damaged by severe wildfire, post fire rehabilitation, areas significantly departed from historical conditions, areas of insect and disease infestation and non-native species site invasion.**
- a. Vegetation structure, age class, and species diversity is the focus for post-fire rehabilitation of forest and rangeland health and the restoration and maintenance of resilient landscapes.
  - b. Post fire rehabilitation should consider salvage and fuels management opportunities, road infrastructure opportunities across boundaries, and watershed protection and stabilization.
  - c. Site rehabilitation activities should focus on areas that are similar to those that have experienced large damaging fires in the past, pose the greatest risk of damaging environmental impacts, and have a track record of successful past rehabilitation efforts.
  - d. Consider ecological community interactions and strive to balance human needs with ecological function and resilience.
  - e. For permittees and users impacted by wildland fire, work to mitigate displaced use. Emphasis should be placed on the prioritization of new stewardship contract opportunities lost due to damage.
  - f. Mitigate cultural impacts through appropriate site, artifact and cultural use protection, restoration or enhancement.
  - g. Prioritize rehabilitation treatments on areas which have a high probability of success. In assessing rehabilitation efforts in areas of invasive species, caution should be used to prevent spread.
  - h. Prioritize land where there is a risk of transferring insect, disease and mortality issues to other ownerships.
  - i. Infestations pose risks to the forests and to the WUI, and require specific treatments; treatment objectives and priorities should be public safety, biological necessity and commerce. Public safety treatments reduce the risk to humans from the effects of the infestation. Biological functions involve vegetation or animal communities threatened by an infestation. Commerce protection includes treatment of an infestation that threatens a transportation system, energy production, water sources, or timber production. Treatments are prescribed, based on these classifications and in conjunction with science.
3. **Increase focus on stakeholder collaborations and the leverage partnerships across all ownerships.**
- a. Landscape restoration and maintenance activities should protect, promote and enhance high value resources such as watersheds, forest and rangelands, wildlife habitat, cultural use areas and sites, recreation sites, and community infrastructure.
  - b. Treatments should be coordinated and planned across ownership boundaries.
  - c. Engage in collaborative management activities that blend traditional ecological knowledge (TEK) with western science, to restore and maintain historical fire regimes across landscapes.
  - d. Encourage public and private sector involvement in risk and mitigation activities.
  - e. Treatment opportunities need to consider smoke management impacts with collaboration amongst all stakeholders, balancing negative impacts from wildfire versus positive outcomes from fuels treatments and prescribed fire.
  - f. Collaboratively review and update air quality implementation plans where appropriate, to ensure prescribed fire objectives are given a high priority compared to the negative impacts of large



wildfires. Transference of risk from smoke impacts within the natural or historic fire return interval could be addressed through re-ignition capability in natural areas that experience suppressed natural fire.



**Figure 5. Smoke Plume Seasonality**

Western counties categorized by the modal (most frequent) month when smoke originates within, or passes over each county. Summarized from satellite observations.

This map identifies the month in which smoke is most frequently observed, shown by county in the West. Outside of these months opportunities may exist for additional prescribed fire uses with limited smoke impacts. It is interesting to note that no area of the West sees its heaviest smoke concentrations during the month of May.

## Resilient Landscapes

Resilient landscapes or ecosystems are forest or rangelands that resist damage and recover quickly from disturbances. Such resilience is related to the natural and historical fire regime in which the disturbance occurs, and the potential need to assist the ecosystem in restoring it to a resilient state. Ecological disturbance can have an impact on the social and economic systems of local communities. In resilient landscapes, the impacts of disturbances can be lessened at a local and regional level through active management. Ecological restoration efforts can have a positive impact on local economies and the social health of communities. Sustaining and restoring landscape resiliency and recognizing the role of wildland fire as a critical ecological process are important goals in the near- and long-term for reducing wildfire hazards and risks. Resilient landscapes, adapted to wildland fire, can protect and enhance important values through management or disturbance.

Factors were identified that contribute to healthy resilient landscapes as part of this analysis. These major factors are; fuels and climate, ecological health, topography and geographical vastness, natural fire starts, high percentage of acres burned and severity, and ownership patterns, uniqueness, smoke impacts, and cultural aspects. These identified key factors all contribute to local and regional risks to watersheds, including issues relating to water quality and quantity, air quality, vegetative health, natural habitats, and economic impacts.

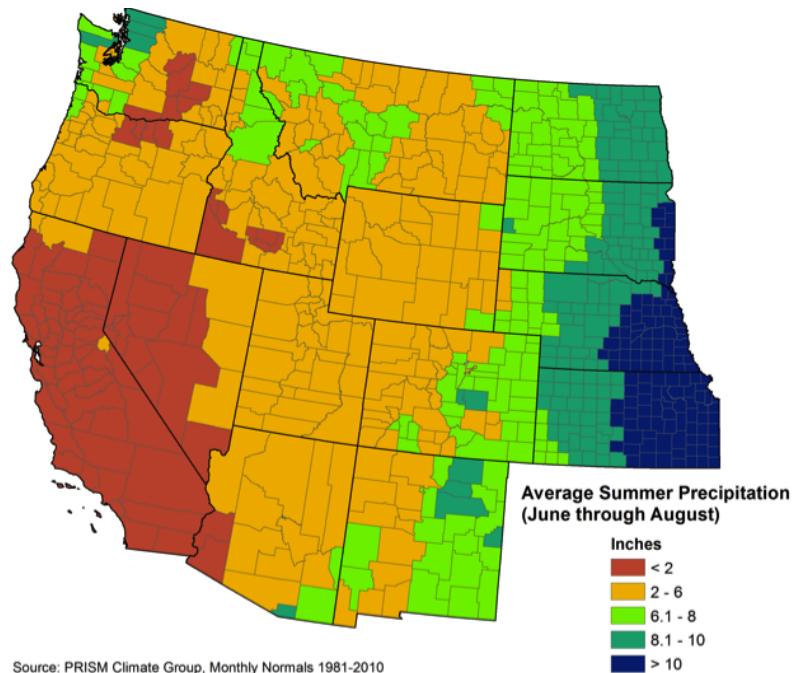
## Fuels and Climate

The Surface Fuel Type map shows a spatial representation of fuels, categorized in seven broad surface fuel types, and grouped by proportion of area in each county. Diverse forest and rangeland vegetation types, with mosaics of complex fuel structures, characterize Western fuels. These environments are increasingly departed from historical conditions, and are experiencing declining forest and rangeland health conditions, that are resulting in a cumulative buildup of fuel loadings.

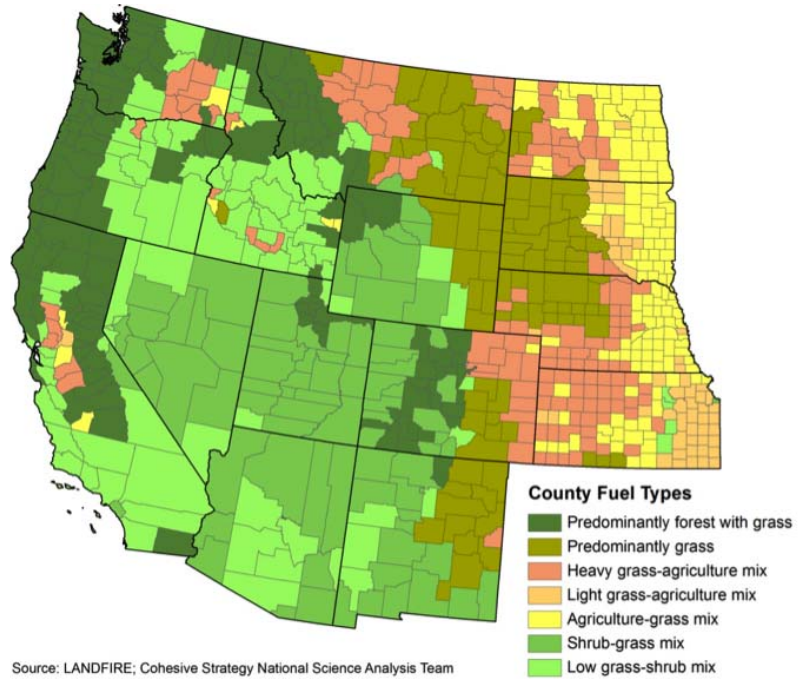
The Average Summer Precipitation Map, Figure 7, shows that much of the West tends to be dry and arid. Vegetative environments that occur in relatively warm and dry

Western climates are highly conducive to fire ignitions and wildfires, with a high potential for intense fire behavior and spread. Wetter areas that experience high ignition frequencies and large fire occurrence may require additional focus, as growing conditions enable rapid growth with fuels accumulation, which may trigger the need for shorter management intervals.

A century of fire exclusion and lack of fuels management has resulted in many forest types seeing



**Figure 7. Average Summer Precipitation**



**Figure 6. Surface Fuel Type**

Source: LANDFIRE and Cohesive Strategy NSAT. Western counties categorized in seven broad surface fuel types, grouped by proportion of area in each county.

dramatic increases in tree density, with ladder fuels and increasing amounts of surface fuel loading and understory brush, that has led to an increased incidence and spread of uncharacteristically large and severe wildfires. This rapid escalation of severe wildfire behavior has resulted in increased wildfire suppression costs, greater fire severity, significant home and property losses, and increased threats to communities.

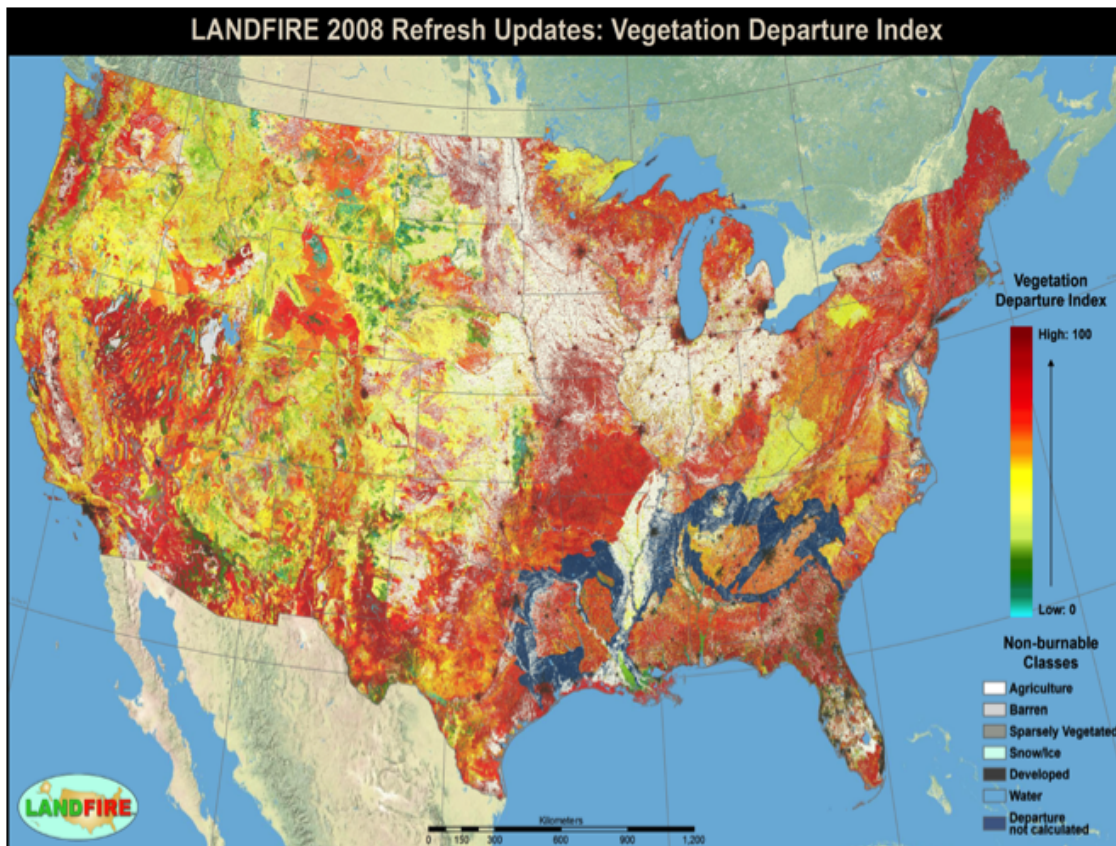
Abnormally large and long-duration fires have been prevalent in the past two decades due to a variety of factors, such as fuels accumulations and changing climatic conditions. Stressed forest or

rangeland vegetated landscapes are increasingly susceptible to infestations of insects, pathogens, disease, and invasive exotic species, which in some areas, have left millions of acres of dead, standing trees that experience wildfire with increased frequency, intensity, and severity.

Western climate is generally warm and dry with seasonal and extended drought conditions. Coastal and mountainous areas, especially the Pacific Northwest and Northern Rockies, are identified in Figure 7 as wetter areas with fire regimes that experience lower fire frequency. Yet when fire does occur, it is characterized by large fires with high intensity.

Healthy, functioning ecosystems are vitally important to the ecological, social, and economic values in the West. The West needs landscape scale changes in vegetative structure and fuel loadings to significantly alter wildfire behavior, reduce wildfire losses, and ensure firefighter and public safety, while achieving longer term landscape resiliency. Some challenging aspects of fuels mitigation actions include steepness of terrain, access limitations, changing climate, and reduced budgets for fuels management, and increasing fuels treatment costs. Some of the physical characteristics, such as large inaccessible landscapes, provide challenges and opportunities for the unprecedented use of fire at the scales at which dominant disturbances are occurring.

## Ecological Conditions



**Figure 8. Vegetation Departure Index Map**

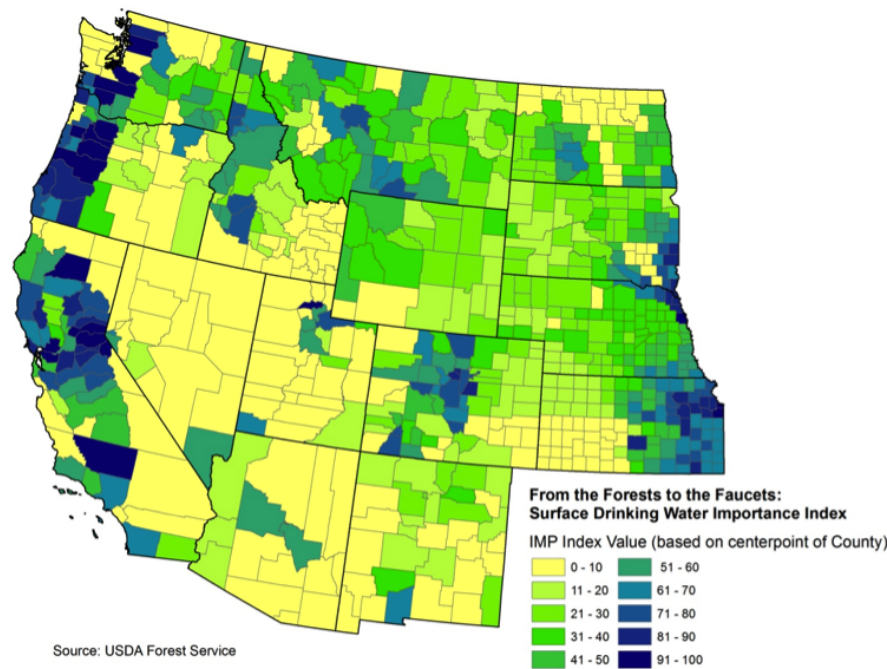
Source: LANDFIRE Vegetation Departure layer

Western forest and rangeland ecological types are varied and expansive across Western landscapes. Western wildland environments are characterized by diverse forest and rangeland vegetation with mosaics of complex fuel structures with habitats that are increasingly departed from historical conditions. The Vegetation Departure Index Map, Figure 8, depicts the amount current vegetation has departed from simulated historic vegetation reference conditions. This departure results from changes to species composition, structural stage, and canopy closure. Many of these landscapes with high departure are experiencing declining forest and rangeland health conditions and a cumulative buildup of fuel loadings.



Stagnant, overgrown forests with increased insect and disease infestations, and rangeland sites being occupied by invasive species are but a few symptoms of widespread ecological health problems in the West Region. The forest and rangeland health problems in the West are widespread and increasing, affecting wildlife habitat, water quality and long-term soil productivity, while providing conditions for uncharacteristically large, severe, and costly wildfires with increasing threats to human life and property.

Healthy ecosystems include values associated with biodiversity, wildlife habitat, and healthy forest and rangeland landscape conditions. As an important value in the West, healthy ecosystems provide numerous ecological services, support a variety of land uses, offer a desirable backdrop and physical setting for homes and communities, and support a great number of historic, spiritual, and cultural resources. Healthy forests support clean water in the form of runoff to local streams and lakes. Surface water is an important drinking water source across the West. Watersheds important for drinking water are shown in Figure 9.



**Figure 9. From the Forests to the Faucets: Surface Drinking Water Importance Index, IMP.**

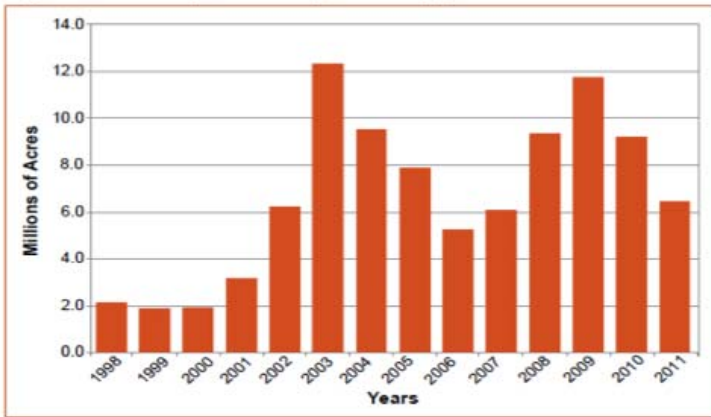
Areas with higher (blue) values represent areas most important for surface drinking water.

Source: (USDA Forest Service)

## Insects and Diseases

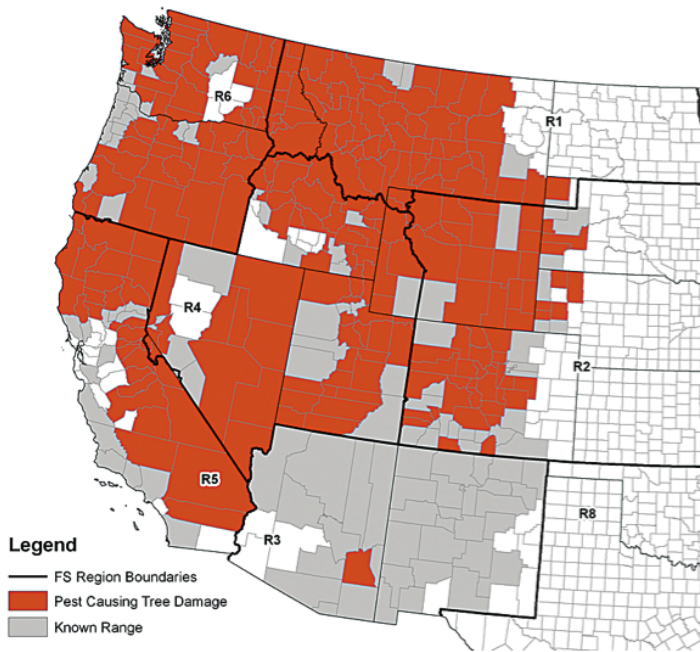
The USDA Forest Service reports that insects and diseases play critical roles in both maintaining balance in healthy functioning forests and causing catastrophic outbreaks and forest loss. These critical roles affect the more than 750 million acres classified as forest land, and millions more acres with trees in urban areas, that provide a wide array of services and commodities, such as timber and other forest products, recreation, wildlife, clean water, energy and jobs. Determining the extent and intensity of insects and diseases through surveys is an important tool to help prioritize actions to be taken by federal agencies, states, and other stakeholders. As occurs with most biological systems, the overall mortality that insects and diseases cause varies from year to year and pest to pest. Figure 10 illustrates how mortality has varied over the past 14 years. In 2011, mountain pine beetle accounted for 59% of areas mapped with excessive forest mortality for the year. (USDA Forest Service, 2012).





**Figure 10. Annual extent of insect and disease forest mortality summarized from the annual survey 1998 to 2011.**

Source: Major Forest Insect and Disease Conditions in the United States: 2011, USDA Forest Service.



**Figure 11. Counties reporting mountain pine beetle in 2011.**

Source: USDA Forest Service, 2011.

The extent of the historical departure is compounded by the impact invasive species are having within the Western region. These invasive non-native species, such as cheat grass, red brome, and tamarisk, are having a major impact on Western fire regimes. These exotics are creating ecological deserts where the native species, not adapted to frequent fire in dry ecosystems, are being replaced. The invasive species are also creating fire suppression issues and impacting overall firefighter and public safety. These Western invasive species are having an overarching impact on all three elements of the Cohesive Strategy. This impact from invasive species is unlike the other two regions, especially when the vast spatial extent of the infestations is considered.

## Ignitions, Burn Probability and Acres Burned

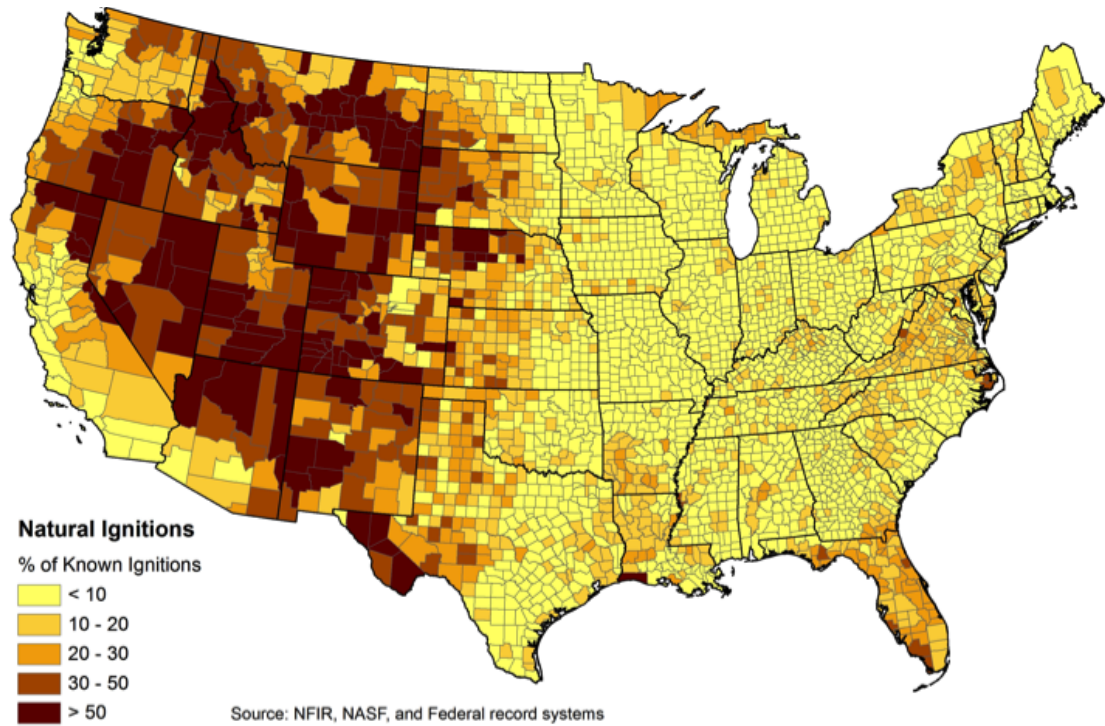


Figure 12. Percent of known fire causes from natural ignitions including lightning.  
 Source: Combined local reports (NFIRS, NSAF, Federal Record System).

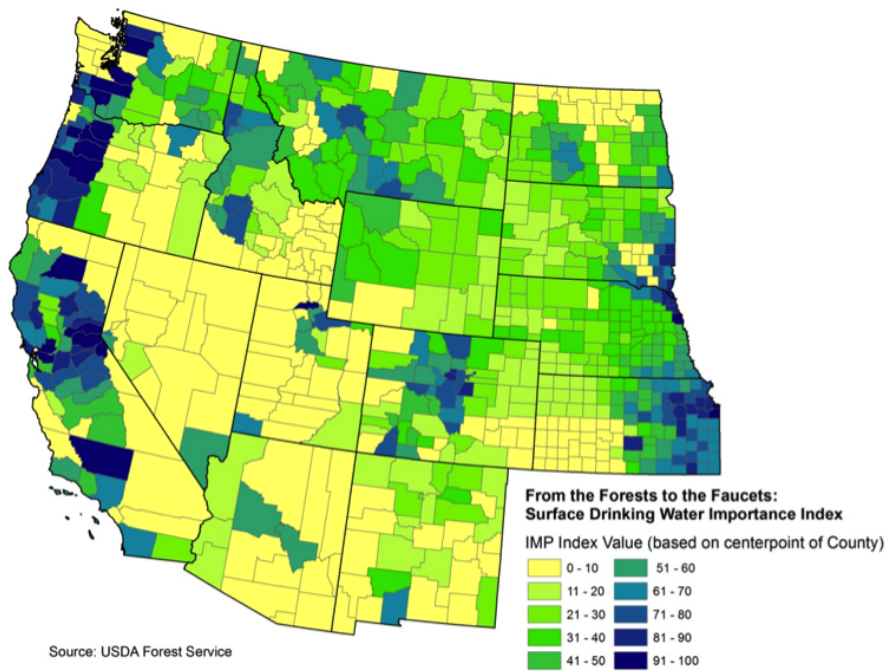


Figure 13. Western counties categorized by the percent of county area with slopes exceeding 15 percent.

Natural ignitions or lightning ignitions are a key contributor to fire issues. For the Western region, lightning ignitions pose additional barriers to suppression in that they often occur in events, causing multiple starts that can quickly exhaust the initial attack capability of a geographic area. In addition, lightning ignitions frequently occur in steep terrain with little to no access, which limits the ability of initial attack suppression resources to suppress the fire. The Natural Ignitions Map, figure 12, indicates that lightning ignitions are not confined to a specific geographic, but occur throughout most of the West.

Lightning ignitions are also a potential solution to the wildland fire issues in the West. The potential solution comes from creating opportunities for beneficial fires where conditions are right.

The following table displays sources of ignition and number of acres burned, nationally and within the Western region. It is interesting to note that in the Western Region, approximately two thirds of all ignitions are human caused, and lightning causes one third. Yet 71% of the acres burned are from lightning caused fires, and 28% are from human caused fires.

**Table 1. A Decade of Fire Causes and Number of Acres Burned in the West**

<b>Total NIFC National 2001-2011</b>	<b>Number of Fires or Acres</b>	<b>Percentage burned per fire</b>	<b>Average Acres</b>
Total Human-caused fires	717,527	85.5%	
Total lightning	121,849	14.5%	
Human-caused Acres	29,251,317	39.6%	41
Lightning AC	44,670,701	60.4%	367
<b>Fires cause and acres in the Western Regional Strategy Committee area.</b>			
Total Human caused fires	184946	63.7%	
Total lightning	105495	36.3%	
Human caused Acres	16,182,719	28.1%	87
Lightning Acres	41,319,501	71.9%	392
<ul style="list-style-type: none"> <li>• <a href="http://www.nifc.gov/fireInfo/fireInfo_stats_lightng.html">http://www.nifc.gov/fireInfo/fireInfo_stats_lightng.html</a></li> <li>• The NIFC lightning and human caused fires and acres data located at <a href="http://www.nifc.gov/fireInfo/fireInfo_stats_lightng.html">http://www.nifc.gov/fireInfo/fireInfo_stats_lightng.html</a> is cumulative including the years 2001 to 2011.</li> </ul>			

Many areas of the West are subject to moderate to high burn probability in any given fire season. Burn probability is estimated using simulation and represents the likelihood of an area burning during large wildland fires. Burn probability can be relatively high in areas with large fires, even though ignition probability is low. In the Mean Burn Probability Map, figure 14, the counties are categorized as high, moderate, or low average burn probability. Fire was simulated with FSIM at 270 meter resolution with burn probability averaged across all the pixels within a county.

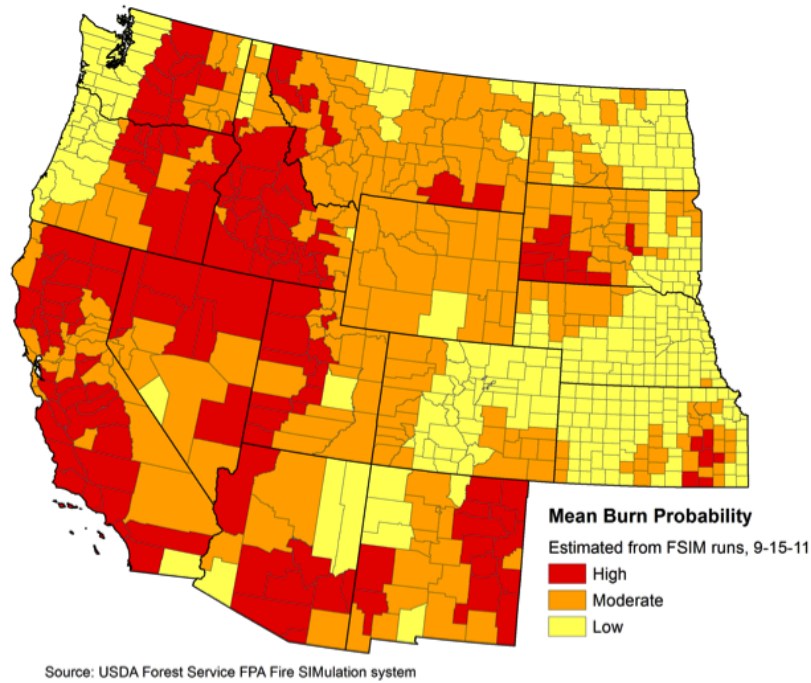


Figure 14. Mean Burn Probability

The magnitude of the large wildfire problem in the West is demonstrated with the Large Wildfire Acres Burned Map, figure 15. This map shows that excluding Florida, almost all the large fires nationally, per year, are in the Western states.

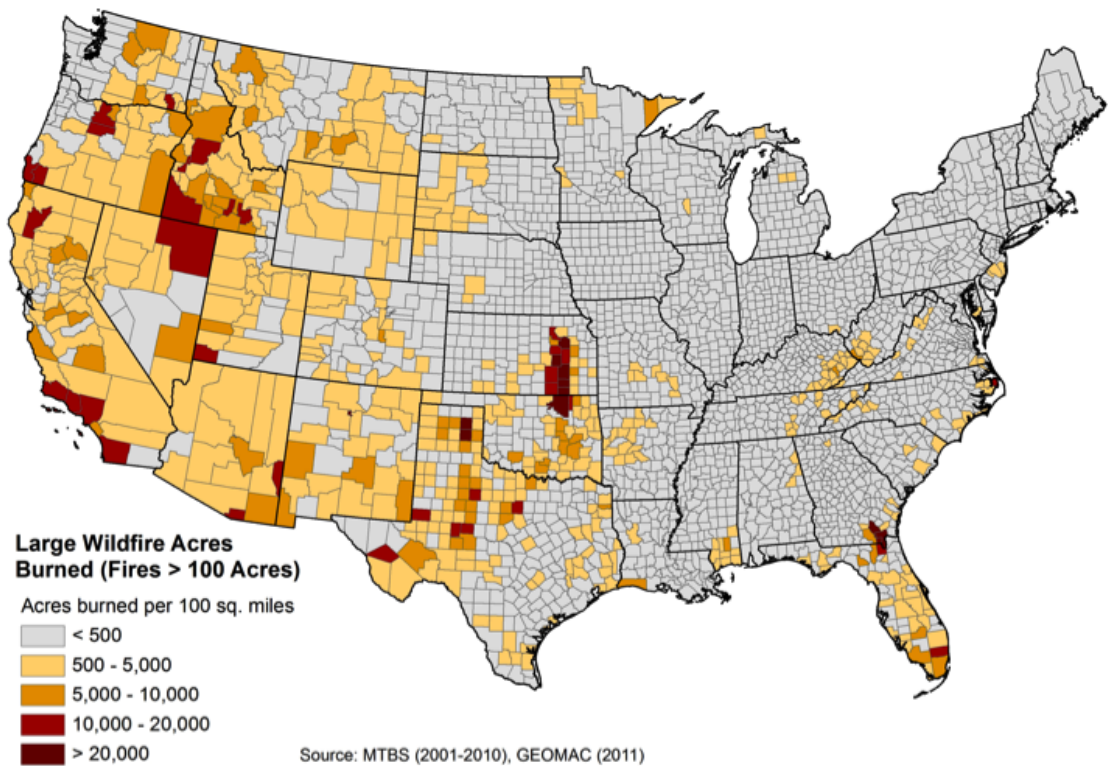
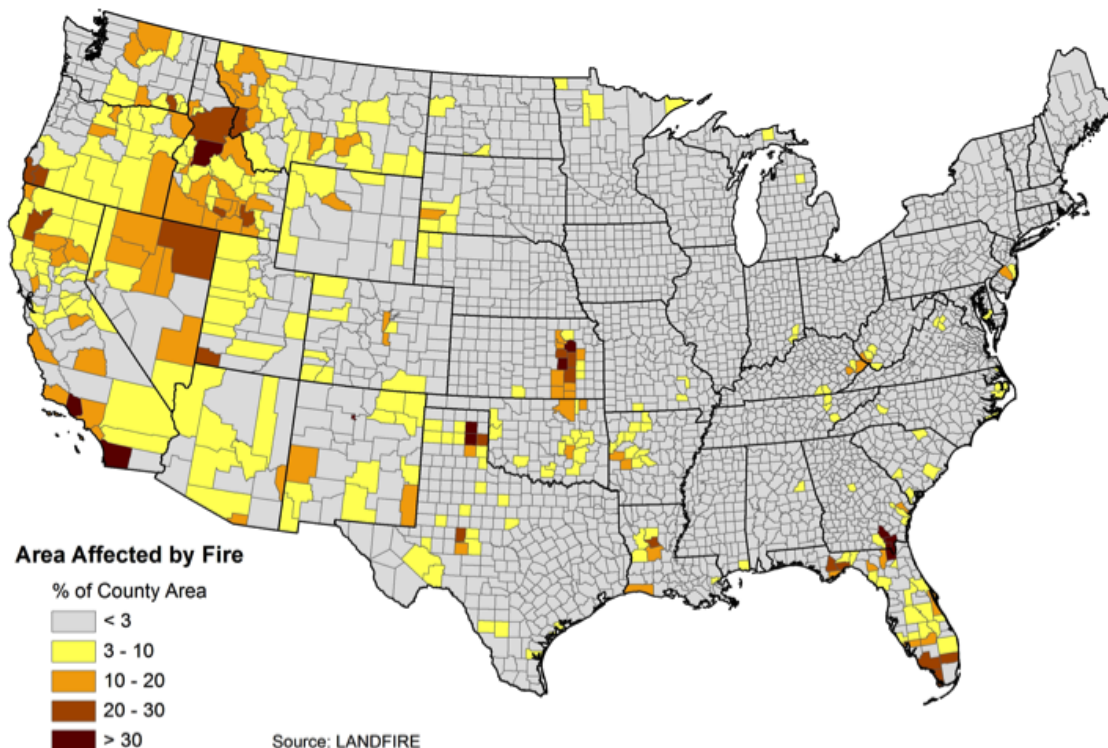


Figure 15. Acres burned per 100 square miles by large fires (300 acres or greater in size) between 2001 and 2011.





**Figure 16. Percent area within each county disturbed by fire shown in eight broad categories.**

Figure 16, Area Affected by Fire, is based on LANDFIRE data. The map shows the extent of areas within the West affected by wildland fire as compared to the rest of the United States. The spatial extent of these Western wildfires is much greater than other parts of the United States. This is exemplified with seven out of the nine wildfires studied as part of the Mega-Fire project occurring throughout the Western states (Valley Complex (212,030 acres, Montana 2000), Hayman Fire (137,760 acres, Colorado 2002), Rodeo-Chediski Fire (468,638 acres, Arizona 2002), Biscuit Fire (499,965 acres, Oregon 2002), Ponil Complex (92,522 acres, New Mexico 2002), and the Boise National Forest portion of the Cascade Complex (302,376 acres, Idaho 2007). Since the study, Arizona, New Mexico, Utah, Colorado, and Idaho have all had new megafires that have exceeded the size of previous state records for the largest fire within the respective state.

Figure 17 shows the number of acres burned each year for the most of the last century in eleven Western states. In the early part of the 20th century, the West experienced numerous large fire seasons highlighted with the fires of 1910. Following World War II until the late 1980's, the extent of wildfire occurrence throughout the West decreased significantly, with an upswing in acres burned throughout the West exceeding five million acres in 2001 and then six million acres burned annually in 2006 and 2007. In the West, 2012 was the worst fire season on record. Western wildfires accounted for 91 percent of total acreage burned in the U.S., with the average-sized western wildfire at least ten times larger than wildfires in the Northeast or Southeast. Table 2 shows the total number of wildfires for each region, average acres burned, and average wildfire size. While figure 17 depicts only eleven Western states, table 2 includes all 17 Western states.

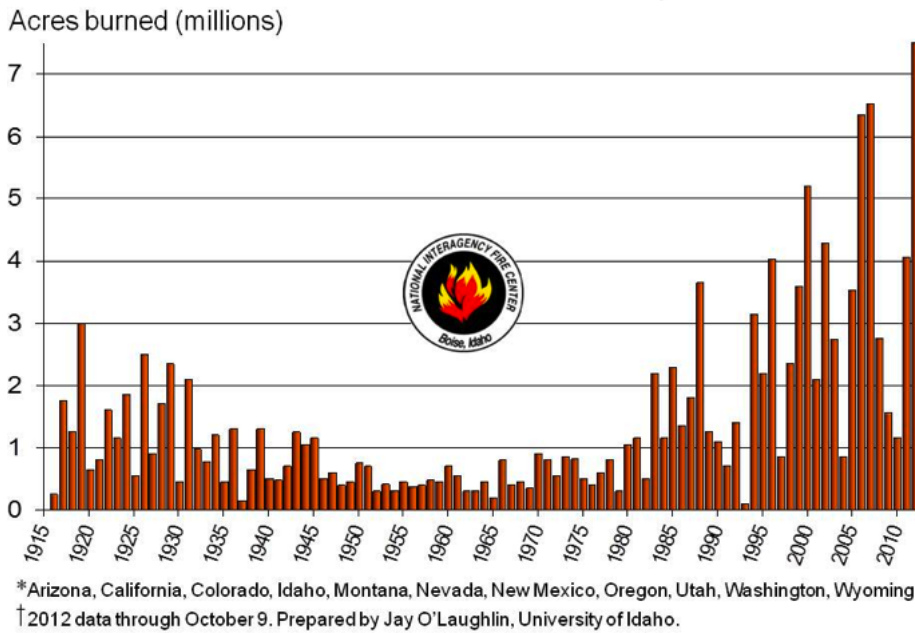


Figure 17. Acres burned in the 11 Western States between 1916 and 2011.

Table 2. U.S. wildfire statistics by region, 2012.

	Northeast	Southeast	West	Total U.S.
Number of wildfires	10,053	16,316	23,203	49,572
Acres burned by wildfires	350,954	444,184	8,050,685	8,845,823
Average wildfire size	35 acres	27 acres	347 acres	178 acres

Not only is the West unique, diverse and vast it also has an ownership pattern that is comprised of predominately federal lands, as compared to other two geographic areas. Public lands comprise more than half the total land area of within the West. In many of the far western states the public ownership is over 60% with Nevada the highest at 83%. When compared to other areas of the country this is a significant component and critical factor when looking at active management and landscape level treatments in the West.

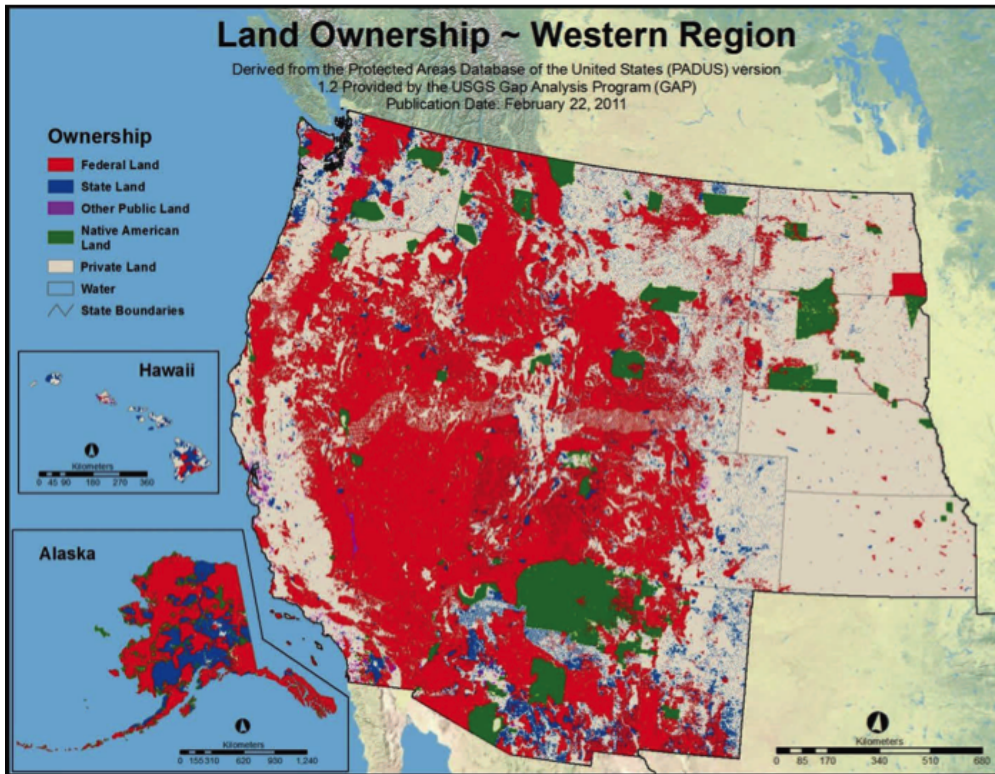


Figure 18. Land ownership in the Western US.

Derived from the Protected Areas Database of the United States (PADUS) version 1.2 provided by the USGS Gap Analysis Program, production date February 22, 2011.

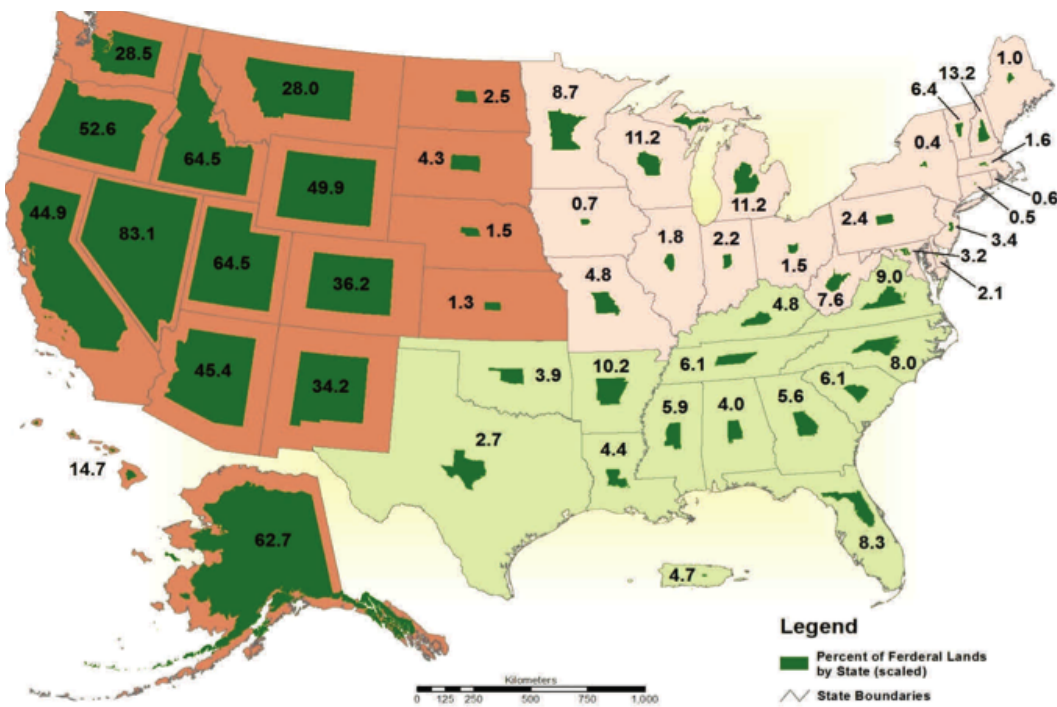


Figure 19. Percentage of each state administered by the federal government.

Source: Dr. Jay O'Laughlin, University of Idaho.



This ownership pattern creates many thousands of miles of common boundaries between federal lands, other lands and state or private forest and rangelands. Often times the different ownerships have differing management and suppression objectives and rules and laws that govern management. The ability to work across borders from state and private lands to federal lands will be critical in creating a cohesive strategy to implement large landscape level treatments. Currently, large areas of public lands are at risk for catastrophic wildfire and have many insect and disease issues, with a significant decline in forest health and resilience. Primarily due to the lack of an integrated active management approach, these lands which comprise over half of the West, are in need of increased active forest and range management – fuels management. This can be accomplished through prescribed fire or natural fires that can have positive benefits in restoring healthy landscapes, while not transferring risk.

Due to the vast ownership of public lands, forest and range health conditions, potential transference of risk, and communities adjacent to public lands, it is very important that a more active management posture is achieved in Goal 1, as a key factor in reducing long term risk.

## Native American Cultural History

Native American cultural identity is at risk throughout the West. The territorial map figure 20 shows the historical tribal linguistics patterns across the United States and approximates individual tribal territorial boundaries. Each tribe within the linguistic group delineations is a distinct political community with unique traditional management practices. Practices such as pruning, burning and coppicing at regular intervals once contributed significantly to historic landscape resiliency and community livelihood. Access to abundant and quality hunting, fishing, and gathering areas as well as other traditional, ceremonial, or religious fire use factors have experienced significant decline following fire exclusion. The Traditional Ecological Knowledge (TEK) that is maintained in the West is at risk of loss if incorporation of this knowledge to practice, utilization, and adaptation cannot be revitalized. To mitigate this risk, the focus needs to be at the homeland scale as an intergenerational process within tribal communities that wish to uphold their inherent responsibilities over tribal lands, territory, and resources. The land

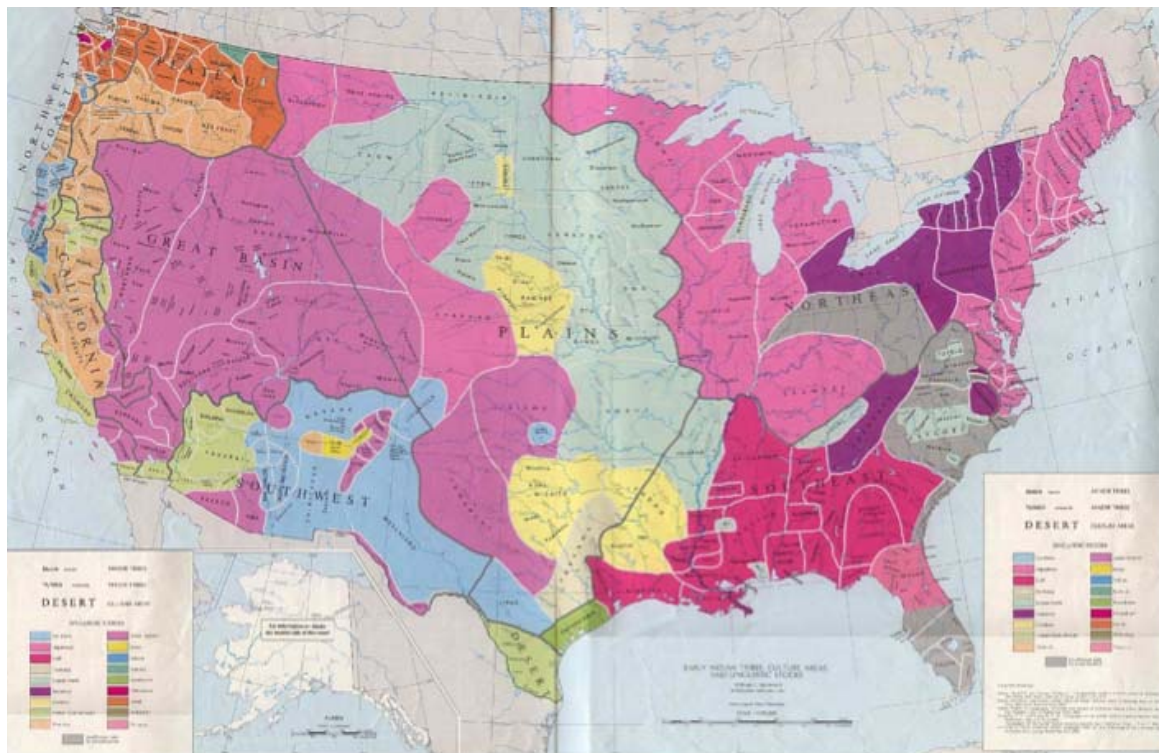


Figure 20. Native American Linguistic map.



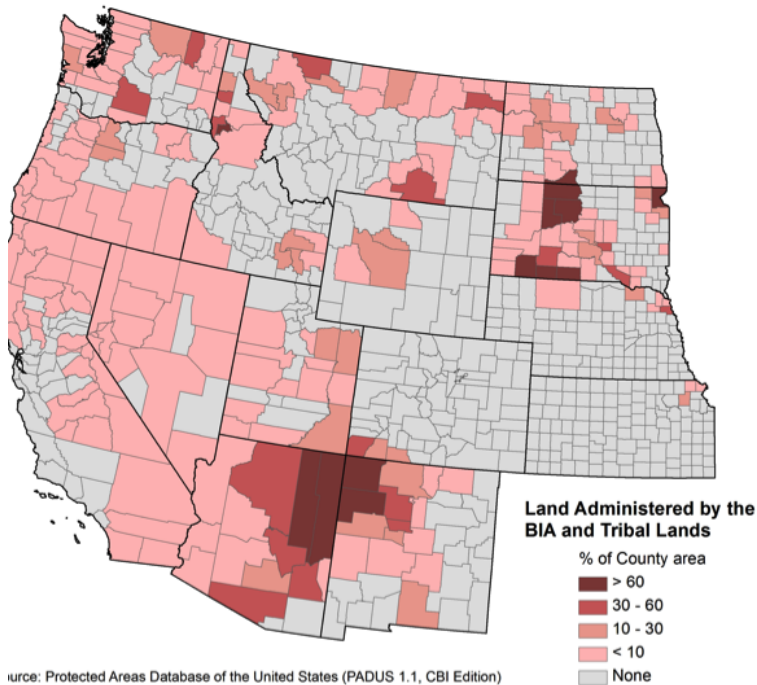


Figure 21. Percent of county land area administered by the BIA and recognized tribal lands.

## Smoke Management

Smoke management is a concern throughout the West as concentrations of smoke can cause human health impacts and impair visual quality. High concentrations of smoke from wildfires with high fuels accumulations are both a nuisance and a health hazard to the public. Smoke management is an important consideration in using fire to restore and maintain resilient landscapes.

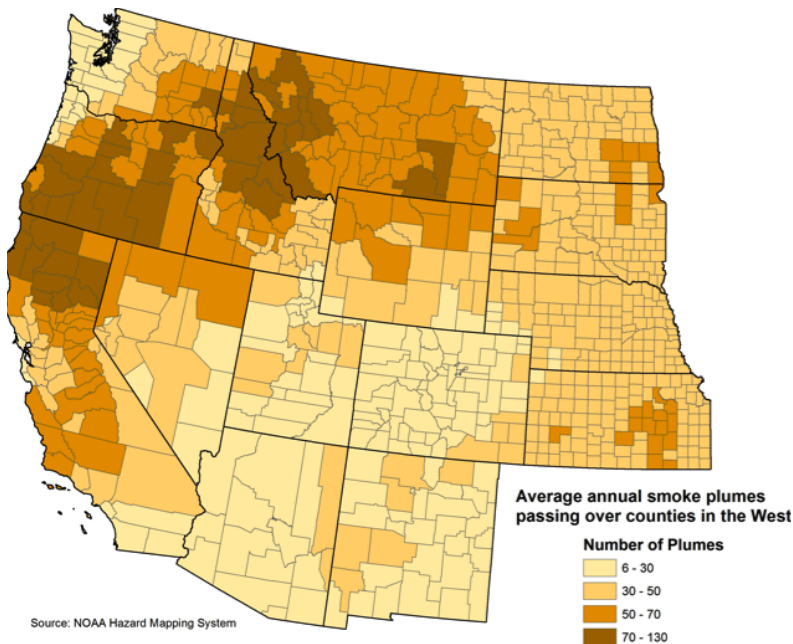


Figure 22. Average annual number of smoke plumes passing over counties.  
Source: Summarized from NOAA Hazard Mapping System.

administered by the BIA and Tribal Lands Map, figure 21, displays lands administered by the BIA and recognized tribal lands on a percent county basis. The map also shows an approximate location where tribal community TEK based collaborations could revitalize cultural land and fire use practices to restore resilient landscapes and to reduce wildfire risks.

## Alternative #2: Fire Adapted Communities

Alternative #2 emphasizes fire-adapted communities in which all stakeholders and affected publics are collaboratively engaged in protecting communities and WUI residents from wildland fire and in fulfilling a stewardship role for their surrounding landscape. A fire adapted community carries out an integrated plan of action, working in cross jurisdictional partnerships to achieve all three goals of the Cohesive Strategy. The degree of adaptation among communities varies, depending upon the relationship of each community to its surrounding landscape and the capacity of its citizens to prepare for and respond to fire. Complete fire adaptation is an ideal state to be worked toward through collaborative efforts within the community. By working together, communities can reduce their risk of catastrophic losses to of life, property, and way of life.

### Focus Areas:

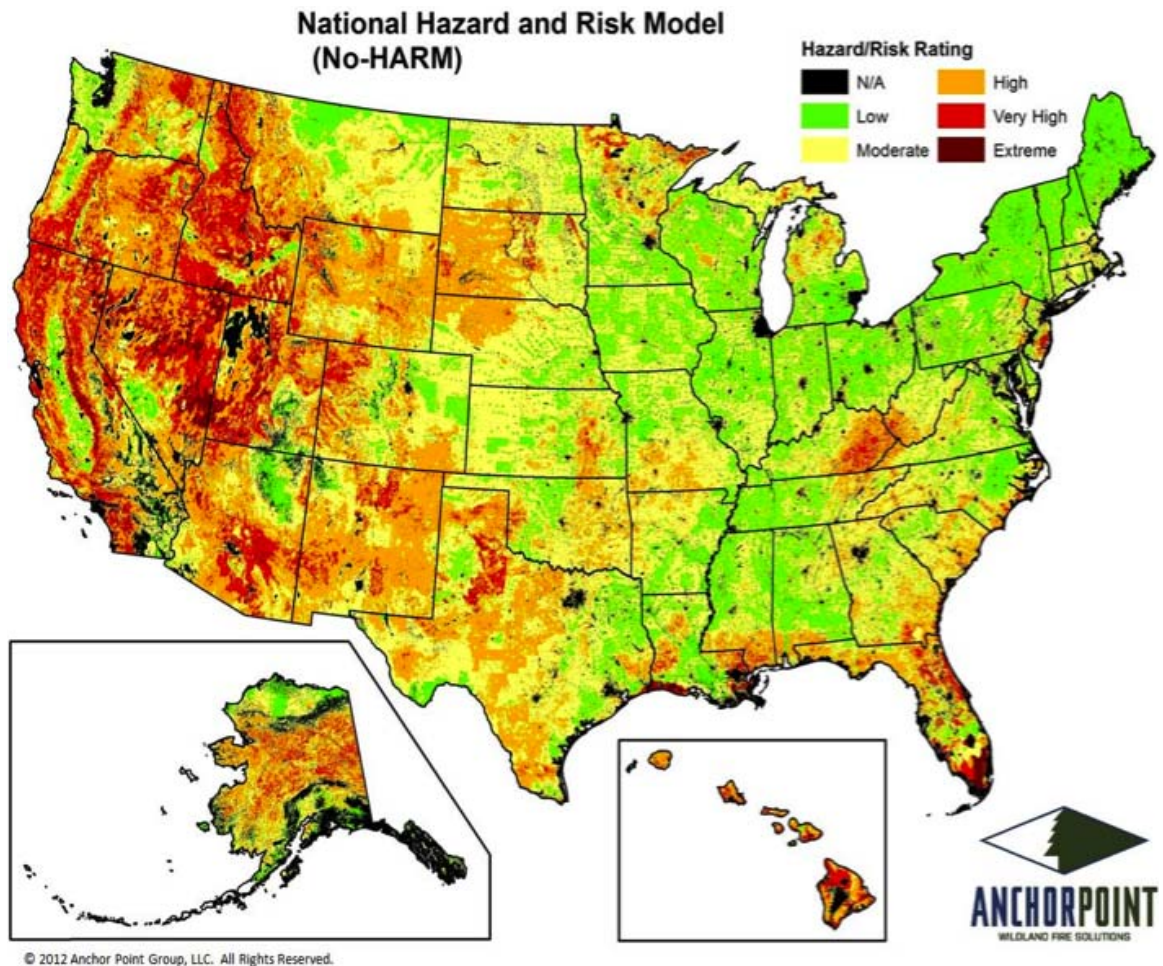
1. **Community wildfire and disaster preparedness planning:**
  - a. State and local representatives, tribes, community members and stakeholder groups, federal and state land managers, and other concerned interests collaborate in developing and carrying out a CWPP or equivalent.
  - b. Community response planning includes establishment of adequate local response capabilities and a joint community wildfire response plan that links CWPPs with federal, tribal, and state fire management and all-hazard plans.
  - c. Multi-scale risks are identified, and communities develop or acquire needed risk assessment and decision support tools.
  - d. Communities at risk understand their risk, are actively involved in mitigating that risk, and are prepared for wildfire.
  - e. Communities use fire adapted community mitigation tools to reduce risk (Firewise, fuel buffers, local protection capacity, Ready-Set-Go, etc.)
  - f. Establishment and maintenance of local, cooperative interagency mutual aid, assistance by hire, or compact agreements is emphasized.
  - g. A strong program of rural fire assistance funding to increase local fire response capabilities is supported and used effectively.
2. **Strategic reinvestment in wildfire prevention and mitigation programs.**
  - a. Identification and prioritization of areas in and around communities, which are at high risk from excess fuels and non-native vegetation.
  - b. Mitigation and prevention efforts targeted to protect high risk areas:
    - **In the WUI area** – this includes fuels treatments to create defensible space and make other needed site modifications and improvements around homes and other structures, and to establish and maintain community safety zones, fuel buffers around communities, and emergency evacuation routes. Other key actions include the hardening of structures against fire intrusion and the provision of necessary related infrastructure such as adequate ingress/egress roads, water sources, dry hydrants, etc.
    - **In the middle ground** – This includes treatment of high value middle ground areas necessary for the protection of watersheds, forestlands, wildlife habitat, cultural use areas and sites, utility corridors, evacuation routes, and other high value areas and assets. Appropriate areas for hazardous fuels reduction and the removal of excess or non-native vegetation to create fuel breaks, expand defensible space, and increase landscape resiliency are also treated.
    - **In all areas** – Stakeholders are encouraged to organize and/or participate in collaborative efforts to restore and increase the resiliency of the community and the surrounding landscape. State, private, tribal and federal landowners and managers should facilitate compatible management across boundaries, whenever possible. Priority based funding of collaborative fuel treatment

projects that support the expansion of local partnerships is emphasized. Landowner cooperation and coordination in invasive species control, wildlife habitat management, fire prevention, and response to insect and disease issues is encouraged and assisted.

3. **A coordinated approach to increasing community self-reliance through capacity building.**
  - a. Conduct public outreach to provide information to community members, to increase public awareness of wildland fire risk and firesafe practices.
  - b. Involve the local people in risk assessment determinations and in carrying out, monitoring, and evaluating the effectiveness of fire prevention and mitigation activities.
  - c. Work toward recognition and acceptance by community members of responsibility for their property and life safety in the event of a wildfire.
  - d. Educate the public, local officials, and the building community of the value of fire hazard zoning, WUI fire codes, defensible space, and the use of non-combustible building and development practices.
  - e. Expand the adoption of preparedness/implementation programs such as:
    - Ready-Set-Go Wildfire Action Plan
    - Firewise Communities/USA
    - Fire Safe Councils
    - Firefree
    - Living with Fire, and similar programs.
  - f. Implement programs that include homeowner and private landowner incentives, such as financial and technical assistance for both protection of private property and for improving forest and rangeland health.
4. **Increase community capacity and increase employment and business opportunities in rural communities by implementing landscape resilience and community wildland fire mitigation and protection efforts.**
  - a. Opportunities are created in fuels reduction and landscape restoration work and through biomass energy projects, green waste reduction, enhanced recreational uses, and related manufacturing and service businesses.
  - b. Communities can enhance economic opportunities by offering targeted education including skills training, and other workforce development services.
  - c. Federal stewardship end-result contracts, compacts and/or agreements can be entered into by Tribes, communities, states, and for-profit or non-profit organizations to conduct fuels and restoration activities on nearby BLM or Forest Service lands.

## Risk to Fire Adapted Communities

When considering wildfire risk and fire adapted communities, we focus on communities at risk – what can be done to protect them from wildland fire, and what has been done up to this point. Fire has been, and will continue to be, present in the ecosystems of the West. Landscapes near communities, and within the communities themselves, can be modified to reduce the likelihood that damage will occur to communities. In the event of a wildland fire, the community itself becomes fuel for the fire.



**Figure 23. National Hazard and Risk of Wildfire**

The No-HARM<sup>1</sup>, (National Hazard Risk Model) map, figure 23, is based on models of fire behavior and probability, using information about fuels, weather, topography and historic fire occurrence, to show the areas of highest wildfire risk across the country. The largest areas of high risk are in the Western states. This map was created by identifying the levels of risk at the “fired” level of approximately 175 acre units. Communities located in moderate, high, very high and extreme fire risk areas need to become fire adapted.

Fire adapted communities (FACs) are defined as human communities consisting of informed and prepared citizens collaboratively planning and taking action to safely coexist with wildland fire. Fire adaption by communities starts with the ability of the community to prepare their homes and other structures for a wildfire, using known techniques to reduce structural ignitability. Ideally, the structures would be able to withstand a fire without intervention by firefighters, as there are not enough trucks or manpower to protect every structure during a wildfire event. Homeowners need to protect against the threat of fire from both direct flames and burning embers, as most home losses are a result of contact with burning embers, which can often fly miles ahead of a wildfire. People living in fireprone environments need to think about fire safety at all times and prevent ignitions, whenever possible.

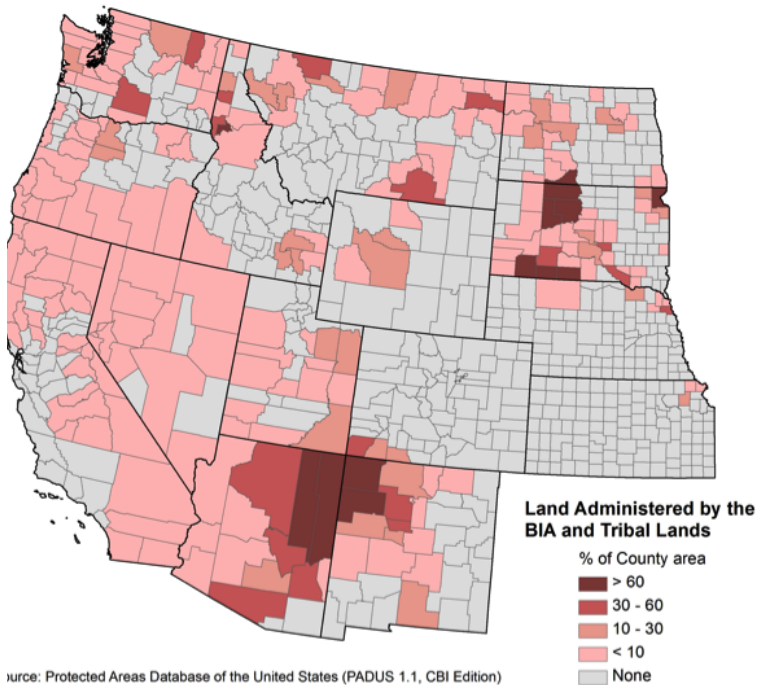
<sup>1</sup> Copyright by AnchorPoint Group, Boulder CO, 2012.



## Housing Density in the WUI

County summaries of existing home/housing density and high, very high and extreme fire risk show that many communities, and even cities, across the West are in harm's way due to the relationship of

homes to fire-prone areas. WUI within the counties vary from high density to low density, with the highest density areas in southern California and Arizona.



**Figure 24. Counties with moderate or higher burn probability and a large percentage of housing units in the WUI.**

Despite the slow down in the housing sector in the past few years, the West is still demonstrating strong pressure for residential growth, particularly in WUI areas. The West has many low density, rural communities scattered across the landscape in fire-prone environments. The National Association of State Foresters (NASF) has documented 6,796 communities at risk in the Western region. Communities are not visible on the county level maps, since they are considerably smaller than counties. Local assessments will need to be done at the community level to document vulnerabilities and identify areas for mitigation. However, that is beyond the scope of this report.

## Smoke Hazards

Smoke from wildfires poses a risk to communities in terms of respiratory health effects on the elderly, the very young, and those with weakened respiratory and immune systems (Noonan, et al 2009). An increased concentration of particulate matter in the air is associated with a large number of health problems including: asthma, COPD, and cardio-vascular disease in people and animals (Pope, 2011). Smoke also causes traffic accidents with subsequent fatalities and injuries. The smoke negatively affects the tourism industry, discouraging summer visitors to Western communities.



**Figure 25. Smoke Plume viewed from space.**

This low angle September 2012 International Space Station photograph captures smoke from numerous central Idaho wildfires. It was taken over extreme western Montana with a view toward the west-southwest over the Salmon River Mountains and adjacent ranges. Smoke fills the Salmon River valley at the center of the image and to the north (right) the Selway and Lochsa River valleys that have their headwaters in the Bitterroot range (lower right).

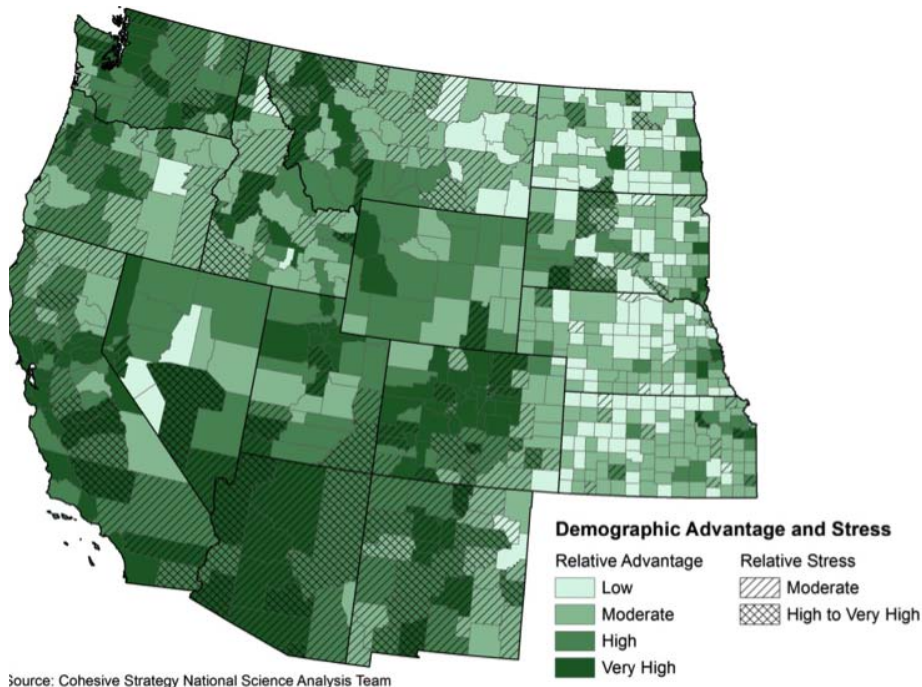
[SOURCE: <http://earthobservatory.nasa.gov/IOTD/view.php?id=79303&src=eo-iotd>].

## Advantaged and Stressed Communities

Some communities have more resources to be able to prepare their homes for wildfire, and some have less and may need assistance. All stakeholders should work with economically stressed communities and the tribes to address hardening homes. Creating defensible space for at-risk populations and firesafe living.

Populated areas contribute to the West's wildfire risk, by adding homes, people, infrastructure, and places of cultural significance to the areas that are threatened. An increasing population with home development in the wildland urban interface/intermix, and increasing potential losses characterize risk.

Census data regarding income and education give us broad indications of where people live who may need assistance in addressing the risks and recovery from wildland fire. Counties with higher than the mean income most likely have some capacity to undertake programs to address their risks and recover if fire occurs. The shaded areas in the Demographic Stress Map, figure 26, show the location of Western counties with apparent disadvantages in terms of socio-economic elements that might indicate they may lack the capacity to undertake programs, without economic or technical support, to address their risks and recover if fire occurs.



**Figure 26. Western counties categorized by socio-economic stress and advantage.**

Since the data is shown at the county level, many counties have both people of higher income levels and lower levels. To target stressed communities, we will need to look at a finer scale than at the county level. However, this analysis gives us a general idea of the counties to look at.

## Open Space Islands

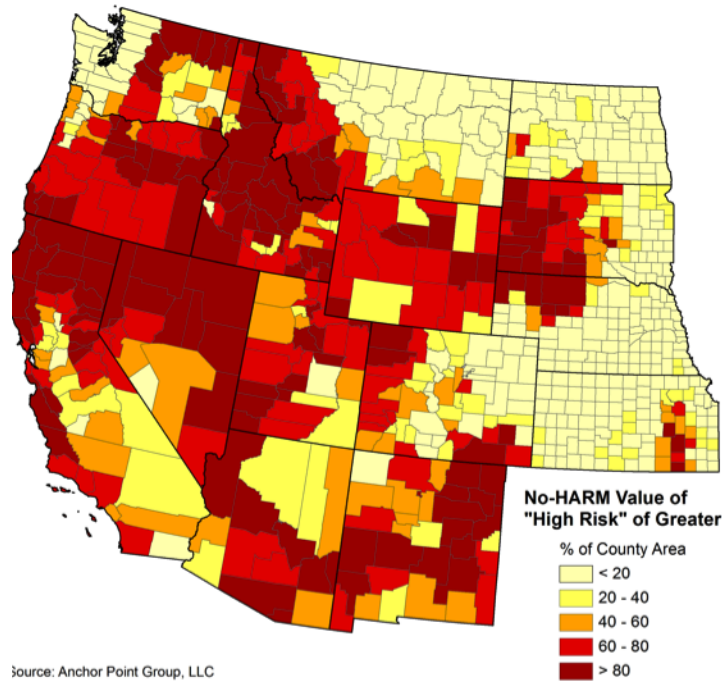
WUI areas are commonly envisioned as a community within the wildland, or at the edge of the wildland. The occluded WUI consists of wildland within a community. The occluded WUI is created as wildlife habitat, park and open space, a watershed, or perhaps a wildland that was not buildable, within the borders of the community. Occluded WUI presents the same issues of forest resiliency, fire response, and fire adapted community in a smaller, more populated situation. These “open space islands” as they are also called, are native vegetation with all of the management challenges faced in the wildlands, but with the added challenge of being surrounded by homes and development. The resilience of these lands is critical to the local community; the response to these lands expands the requirements of the local fire department and requires them to seek new or expanded assistance agreements. Risks associated with open space islands should be evaluated at the local level. In subdivisions where some lots remain undeveloped, lack of maintenance on the undeveloped lots poses a risk to the nearby homes.

## Hazard and Risk at the County Level

The map below is based on the county level No-HARM data. It shows the percentage of land area of each county that is located in areas of high, very high, and extreme wildfire risk. Counties with large percentages of land in the highest risk categories are shown in the darkest shades of red. In this way we show relative risk at the county level. The NO-HARM data is aggregated at the fireshed level, which is significantly finer than the county level information collected for this study. In figure 27 we aggregate the data at the county level to coordinate the No-HARM wildfire risk information with all the other variables in this study. Communities located in counties with a large percentage of high risk lands should be identified for fire adapted community activities.

It should be noted that the county level aggregation, as seen in figure 27, eliminates detail important to the evaluation of hazard and risk at the community level, as presented in the native No-HARM data.





**Figure 27. Counties categorized by the percent of county area rated as high-risk or greater by AnchorPoint's No-HARM wildfire risk model.**

## Social Science and Fire Adapted Communities

A fire adapted community is a knowledgeable and engaged community in which the awareness and actions of residents regarding siting, construction, and/or modification of infrastructure, buildings, and landscaping and appropriate management of the surrounding ecosystem lessens the need for extensive protection actions and enables the community to safely accept fire as a part of the surrounding landscape. The goal is to reduce risk from wildfire in at-risk communities, reduce damage from wildfire when it does occur, and reduce fire suppression and structural protection costs, while also enhancing firefighter or civilian safety.

Community members work together to prepare for wildland fire through fire adapted community activities such as: educating residents about wildfire risk and taking action to mitigate those risks, managing fuels on public and private lands in and around the community, developing and maintaining a firebreak around the community, and designating and protecting evacuation routes, and/or establishing safety zones. Preparing and carrying out a CWPP or equivalent document, becoming a Firewise Communities/USA or Firesafe Council/Chapter community, and participating in the Ready-Set-Go program are three important actions that help a community adapt to fire. Individual homeowners and families prepare for wildland fire by reducing fuels around their homes (creating defensible space), building/retrofitting and maintaining their homes with ignition-resistant building materials, and preparing for evacuation or other emergency efforts.

When a community works together and undertakes mitigation and management activities, the community moves toward a more fire adapted state. The more activities the community engages in, the greater the fire resistance of the community. Studies have shown the synergistic effect of multiple activities to protect homes and communities from wildfire (Renner et al. 2010). A community becomes fire adapted as it takes action to reduce risk. Figure 28 shows a list of actions and programs that an existing community can undertake to become fire adapted, or better suited to the fire prone environment in which it exists.





**Figure 28. Elements of a fire adapted community.**

Source: US Forest Service.

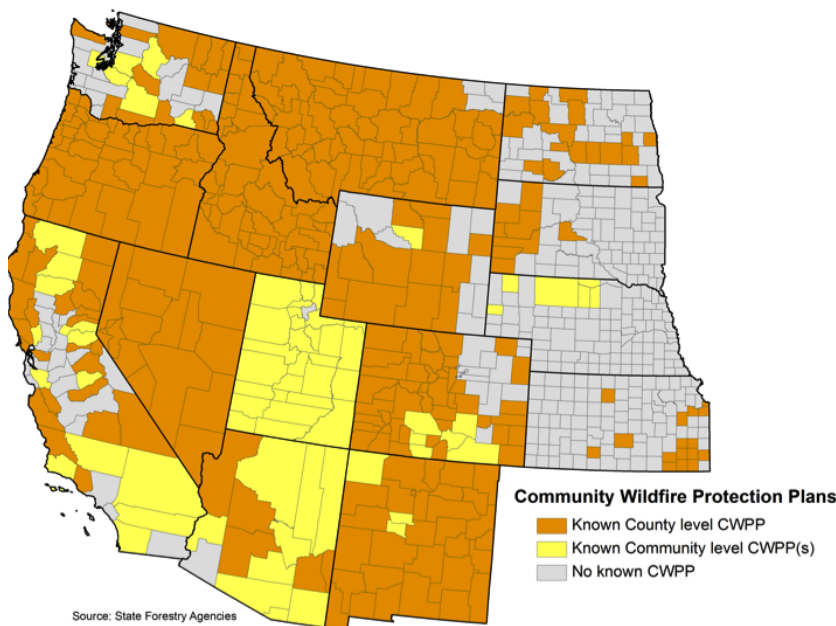
## Community Wildfire Protection Planning

The most important first step in becoming a Fire Adapted Community is the creation of a CWPP. The CWPP brings together a core group of stakeholders within the community to collaboratively craft a plan for reducing the wildland fire risk to the community. Following a risk assessment, which identifies the areas in which the community is vulnerable, they prioritize fuels treatments within and around the

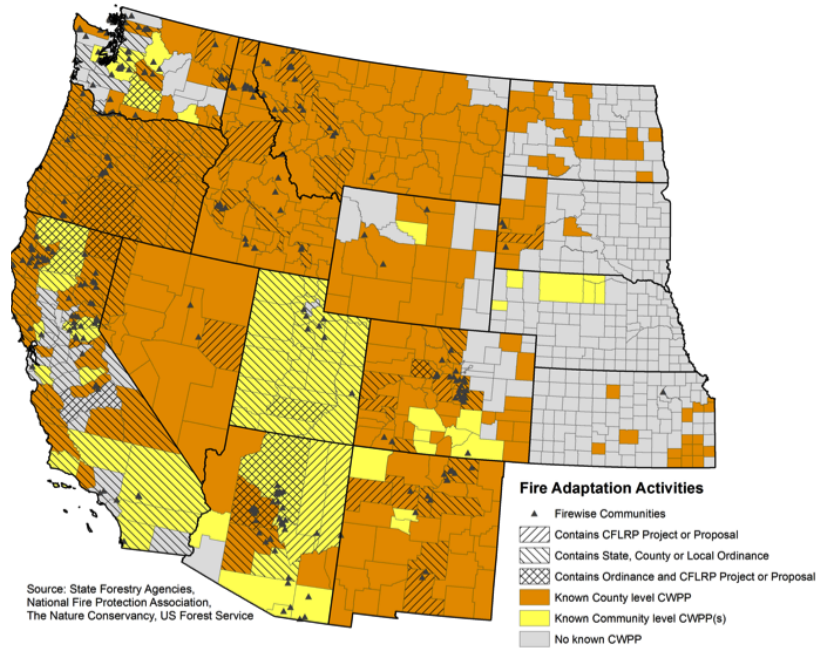
community. The stakeholder group educates local homeowners about hardening their homes against fire, and they consider all of the available options, using the best available knowledge, to mitigate the risk the community faces. CWPPs define a WUI boundary for the community, which can include areas of importance to the community, such as watersheds, evacuation routes, recreation areas, wildlife habitat or cultural areas, utility corridors or more. These areas, which lie outside the jurisdictional boundary of a community and have importance to the community, are the middle ground. Since communities have the ability to define their own WUI boundary, the middle ground can be protected and actively managed within the community's WUI boundary. CWPPs have proven to be an effective tool in moving toward accomplishment of all three goals of the Cohesive Strategy.

A CWPP can be a very powerful tool, however, not every CWPP gets implemented. The level of community involvement in CWPP planning is a good indicator of the power of the individual CWPP. A study of three communities that created CWPPs and implemented some fuels treatments, found that the treatments enabled easier fire suppression and contributed positively to community protection when a wildfire occurred. In addition, the relationships developed during the planning process improved communication and cooperation during the fire. (Jakes and Sturtevant 2012).

The Community Wildfire Protection Plan map shows that most counties in the West have completed a CWPP or its equivalent, and many individual community-level CWPPs have been developed to further refine mitigation planning at the local level.



**Figure 29. Counties that include communities with CWPPs or with county-wide CWPPs.**



**Figure 30. Counties reporting adaptation activities including CWPPs, ordinances, and CFLRP projects.**

Source: State Forestry Agencies, National Fire Protection Association (NFPA), The Nature Conservancy (TNC), and USDA Forest Service

## Fire Adaptation Activities

The Fire Adaptation Activities map, figure 30, shows the locations of county and community level CWPPs plus other wildfire mitigation programs, including the locations of Firewise communities, and states, counties and municipalities with ordinances requiring defensible space. The two most important actions to protect structures from wildfire are the creation of defensible space and the installation of a Class A roof. Three states — California, Oregon, and Utah have adopted statewide laws relating to defensible space and other parameters of reducing risk, including Class A roofs and ignition-resistant building materials on houses in high risk zones. The ordinances are different in each state, but the common denominator is the requirement for defensible space.

Model WUI ordinances, such as the International Code Council's Wildland Urban Interface Code, or NFPA's Standards 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire and 1141 Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas, contain a network of standards for homes - including defensible space, roof and building component requirements - and neighborhood standards for - site planning and preparation, roads, bridges, water quantity for fire fighting and other requirements. These ordinances can be adopted at the municipal, county, or state levels. Wildfire mitigation requirements can be incorporated into zoning ordinances, subdivision regulations, building and fire codes, nuisance ordinances, or even adopted in neighborhood covenants, codes, and restrictions (CC&Rs). Many jurisdictions believe that ordinances are the most effective means to motivate homeowners to prepare for wildfire. It is important for the ordinance to have requirements for maintenance of defensible space over time and an enforcement clause in the regulation.

The map also shows the locations of Collaborative Forest Landscape Restoration Program (CFLRP) projects. These are large-scale projects to reduce fuels and restore landscapes funded under the Collaborative Forest Landscape Restoration Act. The goals of these projects parallel the goals of the Cohesive Strategy.

This map clearly shows that the West has been mobilizing at the state, county and community levels to reduce wildfire risk. The states have been active for the past 10 years under the National Fire Plan

and the 10 Year Implementation Strategy. Programs exist in many states for education, homeowner assistance with prescriptions for fuels reductions around homes, assistance with debris disposal – such as offering free chipping of slash or waste collection, and 252 fire departments across the West that promote the Ready-Set-Go program for fire and evacuation preparedness.

Fire adaptation is a process that requires continual updating and renewal of efforts to be prepared and to keep fuels reduced. Communities need technical and financial support to continue to move closer to a fire adapted status. Efforts by the federal agencies, states, counties, and local governments need to continue to grow to reach more communities and more individuals.

## Public Perceptions of Wildland Fire in Social Science

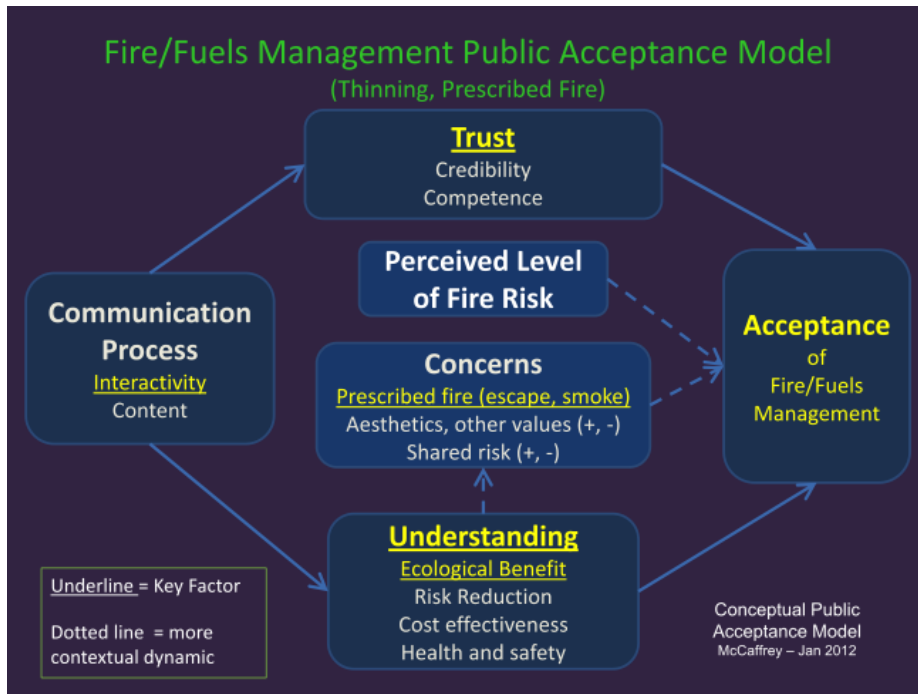
Research from the field of social and behavioral science informs our understanding of fire adapted communities, and how people deal with living in a high risk environment. Recent studies have shown that residents are often well informed about fire and the role of fire in the ecosystem, and generally are supportive of fuel reduction. McCaffrey, *et al* found that “particularly for those in high fire hazard areas, individuals often have a fairly sophisticated understanding of fire’s ecological role”, and further that “overall, results clearly show that prescribed fire and mechanical thinning are, at some level, acceptable management practices for over three-quarters of the public” (McCaffrey, 2012). Several studies have shown that the public thinks fire management planning is primarily the responsibility of (federal or state) agencies, but they want to be informed about management activities and involved in the planning. Another survey found that respondents supported resident involvement in planning focus groups and advisory committees, and believed that education and outreach should be part of a fire hazard reduction program (McCaffrey, 2012).

Research has revealed some key mechanisms that lead to action and how to help a community mobilize. The McCaffrey report conclusively finds that “interactive outreach at the local level” (i.e. people talking to people) is the most effective means of communicating about wildfire issues, and that raising public awareness/education promotes individual action, builds public-agency trust, and builds broad support for fuels management efforts – all key factors in effective fire management. Local action and education are essential.

The conditions for local action include:

1. A trusted source of information. Local fire departments and local state and federal fire and land managers are often the sources.
2. A trusted local convener/facilitator for local regular discussions, planning, learning
3. Fire information set in a local context.
4. An experience with risk or high risk awareness.
5. A feeling of “agency”, that what they do will make a difference in fire behavior and effects and that the actions will actually take place.
6. True “agency”: the local capacity to “get work done”
7. A feeling of reciprocity among neighbors and landowners, “shared risk/shared responsibility”.

The model below shows the relationship of key elements of the of fire and fuels management public acceptance model. It shows how people can become accepting of thinning activities including prescribed fire and mechanical treatment. It shows the interactive communication process leading to understanding of the ecological benefits of thinning activities, and building trust in the source of the information, which leads to acceptance of fire and fuels management.



**Figure 31. Factors influencing public acceptance of fire and fuels management activities.**

Source: Sarah McCaffrey, USDA Forest Service, Northern Research Station.vancy (TNC), and USDA Forest Service

Attention should be paid to every step of this process. Agencies working with the public should be sure to institute an interactive communication process at the local level.

## Regional Models of Fire Adapted Communities in Resilient Landscapes

There are many model programs for use of FAC tools, techniques, and technical assistance. There are multiple web resources, including CWPP handbooks and examples, the Firewise Communities/USA program, Ready Set Go! And, and numerous federal and state websites offering information on wildfire risk mitigation to homeowners and communities. The fire adapted communities website - fireadapted.org, is designed to assist local leaders through the many elements of adaptation. However, tools, handbooks, and expertise by themselves, do not lead people to action. Research shows they are effective:

1. In peer-to-peer learning venues (Goulette 2012).
2. When accompanied by federal and state agency and/or NGO technical assistance, (Goulette 2012).
3. When trust is created through experience and personal relationships (McCaffrey, 2012).

The Fire Learning Network (FLN), sponsored by the Nature Conservancy, the US Forest Service, and the land management agencies of the Department of the Interior, is an example of large scale application of the concept of creating fire adapted communities in a resilient landscape. The FLN started in 2002 to provide a social learning network for the people engaged in ecological fire restoration. By 2010, it had 15 regional networks working on 157 landscapes totaling 150 million acres, and 177,000 acres had been treated with prescribed fire. (FLN, 2011). The FLN nurtures expertise in ecological fire restoration and collaborative planning by linking multi-stakeholder collaboratives to regional communities of practice. Additional examples of large-scale projects for landscape resiliency, reducing risk to communities, and improving local economies can be found in the CFLRP in 23 locations across the country.



## Potential Outcomes

Fire adapted communities are a good investment. A recent post-fire assessment by FEMA in Colorado Springs, CO found a benefit cost ratio of 517:1. That is, for every dollar FEMA invested in wildfire mitigation projects in Cedar Heights subdivision, there was a savings in suppression cost of \$517.00. (Randall, 2012). Firefighters were able to save 82% of the homes in the three neighborhoods impacted by the Waldo Canyon Fire. Colorado Springs has been working on education homeowners and reducing fuels around homes for ten years. This preparation led to orderly evacuations when needed, and a minimal loss of structures. Similar investments are needed in communities in high wildfire risk areas throughout the West.

## Potential Impact of Fire Adapted Communities Actions

If greater investments are made in increasing the fire adaptation of communities, that is, moving communities along the continuum from start-up communities through active communities to innovator communities, the residents of those communities will be empowered to reduce their own wildfire risk. This will result in greater neighborhood safety, reduced stress and general feeling of well-being within the at risk communities. Two examples illustrate the potential impacts of fire adapted communities activities. The Whitefish, MT story is one of preparedness and development of a multi-faceted mitigation program within a community, done in implementing a CWPP. The Hughes Creek, ID example is the story of cooperative effort between the community and the Forest Service in fuels treatments in the middle ground, which protected the community from a recent catastrophic wildfire.

The Whitefish area of Flathead County in northwest Montana has year-round population of about 8,000. Most of the land surrounding Whitefish is forested and managed by federal, state and private industrial landowners. Flathead County did a CWPP in 2005. In 2007, a number of substantial fires in northwest Montana – including one just 20 miles west of Whitefish – motivated the entire community to take action. Over 50 community members participated in the development of a community level Whitefish Area CWPP, and the Whitefish Area Fire Safe Council (WAFSC) was formed to ensure that the community's CWPP would be implemented. WAFSC developed a list of projects to pursue, which together span all three goals of the Cohesive Strategy. Regular monitoring and reporting to the community was also built into the work program

Prevailing winds in the Whitefish area blow out of the southwest, so wildfires starting to the south and west generally present the greatest threat to the community. A major focus of WAFSC's activities has been the creation of continuous shaded fuelbreaks west and southwest of Whitefish. State land managers, several homeowners' associations, and numerous private landowners all have participated in the fuelbreak effort and forest improvement activities. Local non-profit organizations have secured several hazardous fuels mitigation and forest health improvement grants that provide cost-share funding to local landowners to create defensible space and reduce fuels on their property.

Flathead County's subdivision code requires that the Final Plat for any new subdivision in the WUI have printed on it:

- “This subdivision is located in the Wildland Urban Interface wildfire priority area where wildfires can and do occur.
- Only Class A and Class B fire-rated roofing materials are allowed.
- Firewise defensible space standards shall be incorporated around all primary structures and improvements”.

At least five area subdivisions have achieved certification as Firewise communities. WAFSC has an aggressive wildfire public education effort. The Whitefish Fire Department also actively promotes increased awareness and mitigation efforts.

Another good example of collaboration and preparation for wildfire is the Hughes Creek fuels treatment project. Located in eastern Idaho, near the Montana border, Hughes Creek is surrounded by national forests. In conjunction with Lemhi County's CWPP, the Forest Service conducted the Hughes Creek fuel reduction project from 2009-11 to help protect the community of Gibbonsville. Property owners

along Hughes Creek also reduced fuels on their land. In September 2012 the Mustang Fire, which had burned over 290,000 acres of land, burned into the fuels reduction project area, located about 5 miles west of the town. When it encountered the reduced fuel area, the crown fire dropped to the ground and the fire fighting crew was able to contain the fire on that side. The Hughes Creek fuels reduction project not only saved the town, and structures along Hughes Creek, but it also significantly reduced the cost of suppressing the fire in that location.

## Strategy for Fostering Fire Adapted Communities

The FAC strategy is designed to speed up the development of fire adapted communities and link them into a sub-regional communication and learning network for continued development and innovation. Communities should be encouraged to move along a continuum toward fire adaptation.

1. **Start-up Communities** are those that have not yet begun to organize for integrated fire management. They may need assistance to catalyze their social interaction, build trust, and set up the collaborative processes necessary for development and implementation of CWPPs, Firewise, Ready-Set-Go, WUI ordinances, etc. Active or innovative communities may be able to help start-up communities with peer-to-peer counseling, sharing of informational materials, and other assistance that minimizes “wheel reinvention” and enables start-ups to benefit from the lessons already learned by those who are further along the path toward fire adaptation.
2. **Active Communities** are those already in the process of mobilizing to address wildfire risk. They have achieved many of the planning goals of FACs and/or landscape resilience, and are using existing resources (volunteers, grants, etc.) to begin carrying out their plans. Their CWPPs and action plans still might need to add a population protection plan, but they are ready or have begun efforts to reduce fuels in accordance with the CWPP.
- 3). **Innovative Communities** are community and countywide groups that are working on integrating all three goals of the Cohesive Strategy. They are likely to be key players in supporting and networking “start-up”, “active”, and other “innovative communities “ in the region. They may need resources to complete fuels treatments in accordance with their CWPPs and to train residents to mobilize in local fire emergencies.

## Alternative #3 – Fire Response

Alternative #3 emphasizes increased stakeholder effectiveness in risk-based wildland fire responses that enhance firefighter and public safety. The alternative includes aggressive, effective initial attack capability where it is deemed appropriate by the local fire management cooperators. The protection of life, property, and resources is the core objective of the alternative. Wildland fire for multiple objectives is encouraged, where desired, and when risk will not be transferred to a landowner or manager without their knowledge and consent. This alternative illustrates a commitment to fiscal integrity which means wise use of taxpayer funds to include: the integration of local, state, tribal, federal, and private response capability in the areas of protection responsibility; resource mobilization; training; and, qualifications at the regional and national level. Much of the contributing risk in this area is connected to workload as displayed by fire occurrence and measures to reduce that workload. Varying levels of resilient landscape restoration and improvement, hazardous fuel reduction treatment, and fire-adapted community work will all contribute to achieving the three goals of the Cohesive Strategy.

Recommendations:

- I. Improve initial attack success
- II. Prevent wildfires
- III. Improve Public information before, during, and after incidents
- IV. Enhance existing capacity
- V. Improve firefighter and public safety

## Focus Areas

### Focus Area 1. Public and firefighter health and safety.

- Wildfire response is a shared responsibility. Stakeholders should identify their appropriate contribution to wildfire response and commit to providing it.
- A rigorous fire prevention program will be maintained by all jurisdictions and coordinated at appropriate landscape scales across agencies, tribes, and partner organizations the safest, least expensive, least destructive wildfire is the one that does not start. Planned ignitions are not wildfires and are highly appropriate both for restoration of fire resilient landscapes and the reduction of fire threat to firefighter and public safety, property, ecological services, resources, and other community-values-at-risk through fuels reduction.
- Develop human factors based prevention programs.
- At all levels, risks, hazards, values and fire management approaches will be discussed among stakeholders throughout the year to adapt to changing conditions and apply lessons learned.
- Aggressive, effective initial attack capability to prevent ignitions from growing into large, expensive, damaging, and dangerous wildfires.
- Use efficient and effective combinations of prevention, initial attack, and fuels treatments to manage ignitions in an area to prevent fires from becoming large, expensive, damaging, and dangerous.
- Use efficient and effective combinations of fuels treatments, resilient landscape restoration, and fire adapted communities to improve public and firefighter safety, property and resource protection, and suppression effectiveness resulting in acceptable cost plus net value change, thus achieving the greatest benefit for public expenditures on large fire management.

### Focus Area 2. In most settings, an ignition management approach that uses prevention of human-caused wildfire; fuels treatments and hazard mitigation; and aggressive initial attack in a cost-effective combination is the best approach to reduce risk, costs, and losses.

- Enables increased collaborative capacities to facilitate integrated roles in local fire management, decision making, training, and response
- Increased collaborative capacity of stakeholders to facilitate integrated local response to fire threats and ignitions.
- Focus on determination of community-based priorities addressing local issues.
- Encourage greater integration of private sector response capabilities and broader application in the West where private sector resource is more cost-effective. Potential uses of private sector resources in fire prevention education, mitigation, fuels treatments, initial attack, and large fire management should be evaluated for economic efficiencies.

### Focus Area 3. Many, but not all, stakeholders recognize that fire is necessary for sustaining fire dependent and resilient landscapes, ensuring flows of ecological services from forests and rangelands to maintain and improve rural and urban economies and lifestyles, and reduce fire risks, costs, and losses.

- Provide for the exchange of fire knowledge and experience among stakeholders and sustained collaborative dialogue leading to more completely shared understandings and goals.
- Educate stakeholders across all agencies and publics about the physical, biological, social and ecological dimensions of wildland fire, fire effects and fire management to enable them to better collaborate on landscape scale coordinated fire response.
- Develop a value among stakeholders to ensure that their decisions about land use and management practices, maintenance, building practices, development, fire response, or activities that might ignite fires do not pass risk or costs to adjoining cooperators or land owners, or constrain their options to use fire in land management and fire protection without their consent.
- Multi-objective fire management activity will require an increased capability to identify multi-scale risks with improved risk assessment and decision support tools.
- In some cases, stakeholders may manage ignitions in ways other than immediate, full suppression, for a variety of objectives, where risk will not be transferred to others without their knowledge and consent.

#### Focus Area 4. Leverage response capability to make use of public sector funds as effective as possible.

- Integrate local, municipal response capability and non-suppression activities at the regional and national levels especially in the arenas of training, qualifications, and mobilization.
- Although many of the actions in this alternative would require a high degree of social, political, or organizational support, if implemented they could save lives, reduce damage, and be a better investment for the public.
- Facilitate interstate sharing of resources - both the logistical and fiscal components.
- Maintain a national mobilization system for resource sharing and enhance sharing of resources between and across states and regions.
- Integrate fire prevention and education across jurisdictions and among nongovernment organizations to take education and information to settings where it will be most effective for the intended audiences.
- Review all burnable acres for protection responsibility. Where lands are not formally assigned protection responsibility, negotiations will designate appropriate protection responsibility.

#### Opportunities for Intervention

- Focus on prevention education programs.
- Focus on fuels treatments to reduce risk.
- Focus on preparing communities for wildfire.

Improving the probability of success on initial response should be the highest priority, followed by reducing the cost and damages caused by escaped initial attack fires.

The success can be improved by firefighters arriving on scene sooner, while the fire is in the incipient stages. The options are:

- Faster response by initial attack equipment
- Faster response by initial attack aircraft
- Improved and dispatch functions
- Improved transportation system in remote areas
- Sending the closest response resources.
- Increase response capacity as determined by workload.

Reducing the fire intensity to a level equal to the initial response force arrival in the time specified. Options include:

- Vegetation treatments to reduce the heat generated
- Compartmentalizing vegetation to limit the spread of the fire
- Reducing the vegetation available for an ignition to start

#### Fire Response

Large expenditures of public funds are made in the West for response preparedness and for response to wildfires. The extent of damage depends on the extent and intensity of the fire and how many homes or acres with other values are affected. In most cases the cost of damage far exceeds the suppression costs. The issue in the West is a matter of local and regional social choices and collaborative decision-making. Mitigating and managing regional risk requires collaboration among landowners, land managers, planners, elected officials, and citizens.

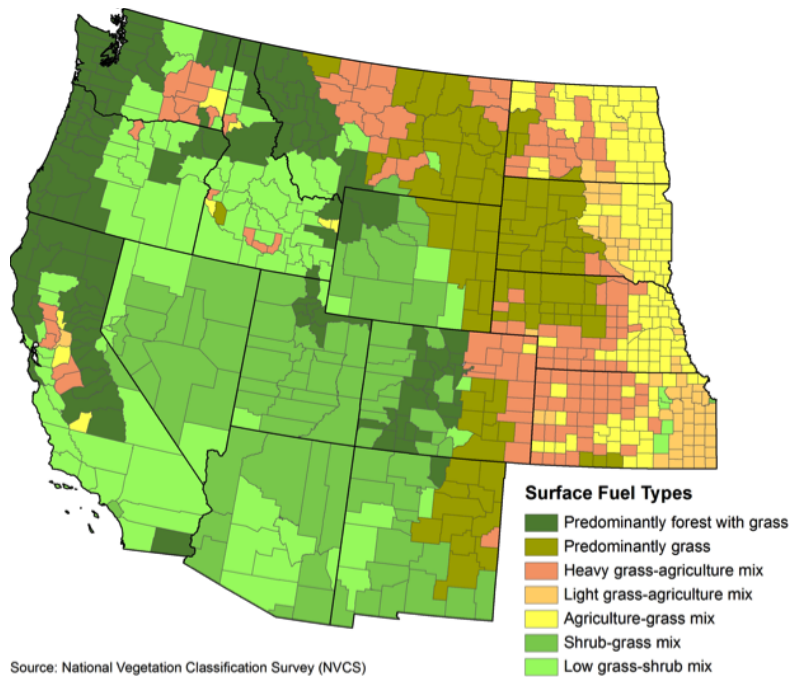
Also, consideration needs to be given to the role that fire might play in ecosystem maintenance and restoration. It is possible, in some cases, to achieve conditions under which fire can spread with little or no damage to values and effectively “treat” the landscape. Under such circumstances there may be beneficial aspects of fire on the landscape. Collaborative fire planning and management options can directly affect factors contributing to wildfire risk.



In this section we will briefly describe some of the key factors that contribute to risk in the response to wildfires in the West. To illustrate the contributing factors, we will describe five themes that represent the current situation. The themes below will help us categorize some key contributing factors to organizational risk in fire response.

## Vegetation Profile as it Relates to Fuels

The first map shows vegetation portrayed as fuels clusters in the West. This representation is useful for determining potential fire occurrence, workload, where potential impact to acreages exists, and how fuel types contribute to risks in fire response.



**Figure 32. Western counties categorized in seven broad categories of surface fuel type based on proportion of area in the county.**

Source: National Vegetation Classification Survey (NVCS).

The following four maps show the location of hotspots across the West, areas where multiple fires have started, and the locations and percentage of accidental and arson caused fires. The arson fire map shows the percent of human-caused wildfire ignitions that were identified as intentional. Intentional fires are a prevalent problem in the West. As noted earlier in Table 1, approximately two thirds of all Western fires are human caused, and lightning causes one third of the fires. However, lightning caused fires burn considerably more acres each year than human-caused fires.

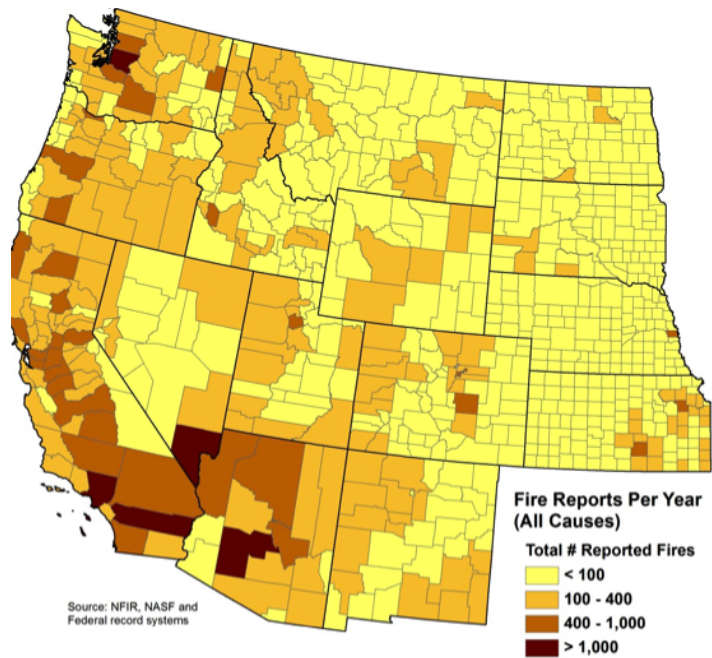


Figure 33. Mean annual MODIS hotspot detections per 100 square miles, from 2001-2011.

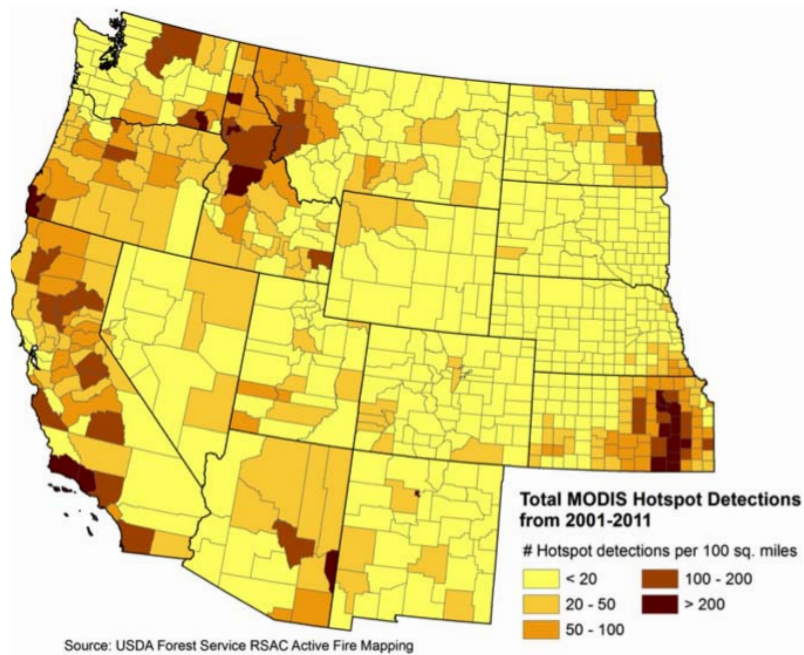


Figure 34. Reported incidents attributed to accidental ignitions using state, federal and local (NFIRS) data of known cause.

Figures 34, 35, and 36 show the reported annual fire incidents from three reporting sectors: federal lands, state datasets, and local fire stations (NFIRS) for all causes (Figure 34), accidental fires (Figure 35), and arson fires (Figure 36).

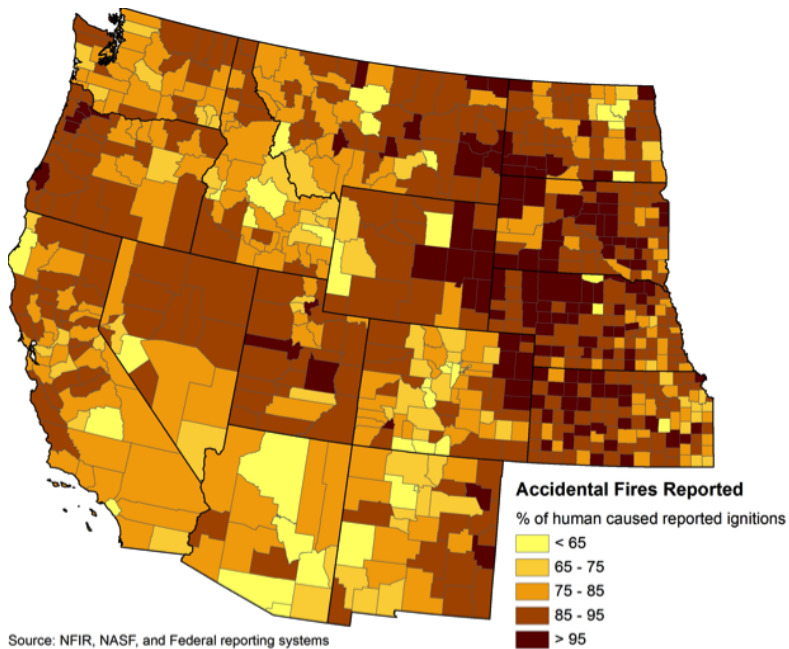


Figure 35. Reported incidents attributed to accidental ignitions using state, federal and local (NFIRS) data of known cause.

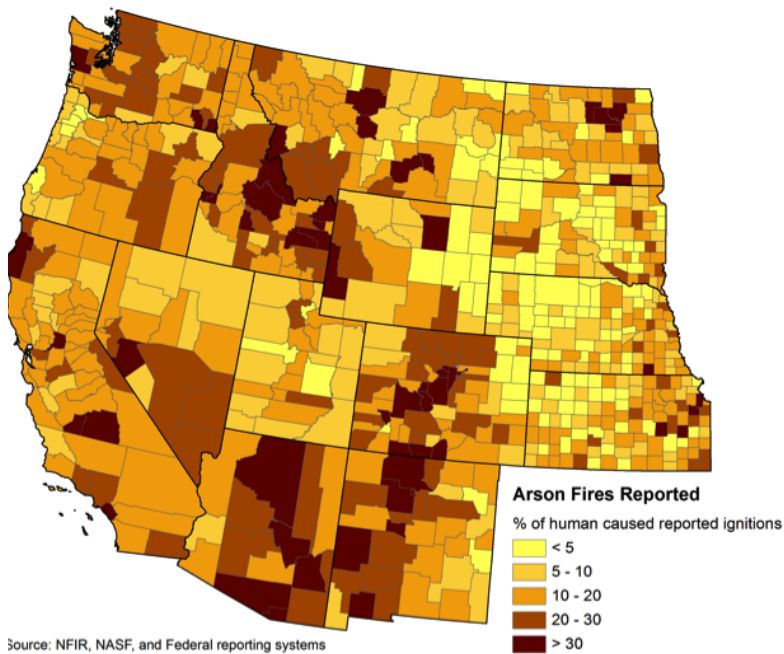
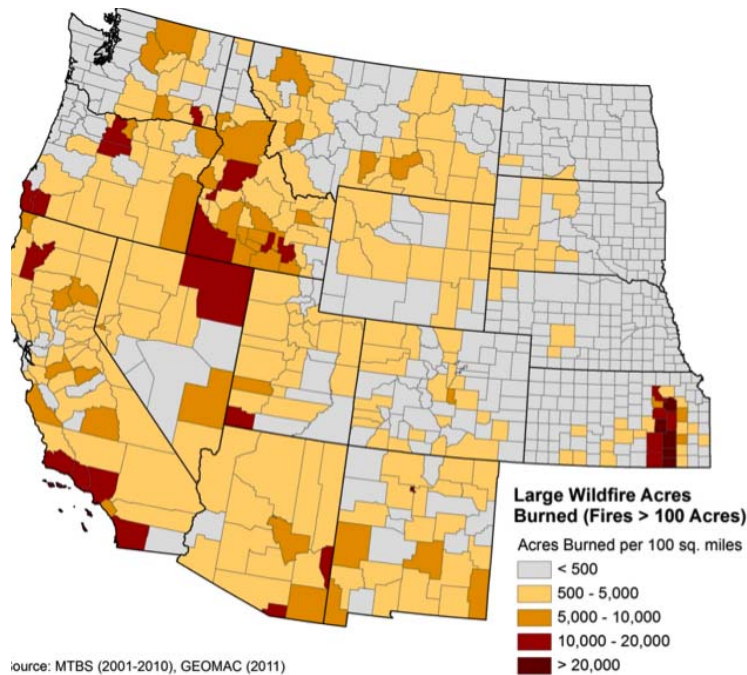


Figure 36. Reported incidents attributed to intentional ignitions using state, federal and local (NFIRS) data of known cause.

The map of large wildfires shows the locations and extent of area burned by fires greater than 100 acres in size, with the highest levels in the Great Basin and Northern Rockies areas.



**Figure 37. Acres burned per 100 square miles by large fires (300 acres or greater in size) between 2001 and 2011.**

## Workload

Workload is defined by the number and locations of ignitions, and by the number and locations of annual (and historical average) acres burned. Consideration of the ignitions causes also influences this risk factor. While natural ignitions will not be reduced through prevention activities, they can be influenced by fuels treatment activities in some cases. Human ignition occurrence can be influenced by aggressive fire prevention measures. The risk of ignitions is related to the kinds and distribution of human activities in an area. This gives us an opportunity to intervene, and set a goal of fewer fires and reduced acres burned, through prevention activities, education, engineering, and law enforcement.

The appropriate application of fire for multiple objectives and prescribed fire will impact risk and workload related to fire response in the future.

## Land Ownership and the Dynamics that Affect Response

- Who has protection responsibility?
- Is the current protection organization reducing risk at the desired extent?

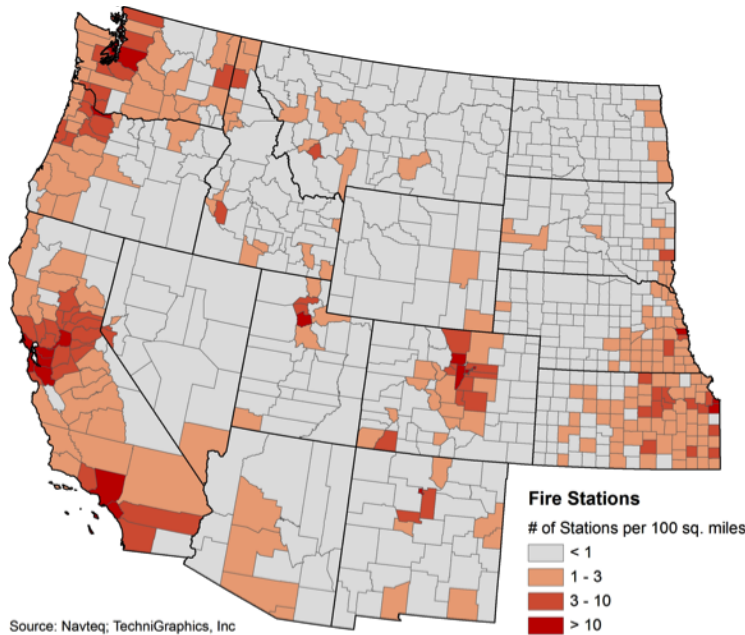
Jurisdictional responsibility and protection responsibility in the West is varied. A unique situation in the West exists in that over 50% of the land base is federally managed, and most of our acreage impacted by fire exists in those areas. This poses both opportunities and barriers in the context of risk. Some challenges include the ability to manage a piece of ground consistent with the needs and values of all stakeholders, and the differences in perception of acceptable risk, damage, and values. The opportunities include landscape level planning, integration of response capability at the level of local, state, federal, tribal, and private response capability before, during, and after incidents. With limited investment capability for response, there is a need to leverage all responder capacity in the most effective manner to leverage capability and overcome differences. Where we are not fully integrated, we see disconnected response efforts, limits in communications and operational interoperability, and safety related incidents. All of these areas can cause increased responder and organizational risk.



Wildfires on federal land have become larger and more resistant to containment on the land of origin. Fires starting in the WUI may trespass onto neighboring jurisdictions; therefore it is important to extinguish all initial attack fires with a combined force.

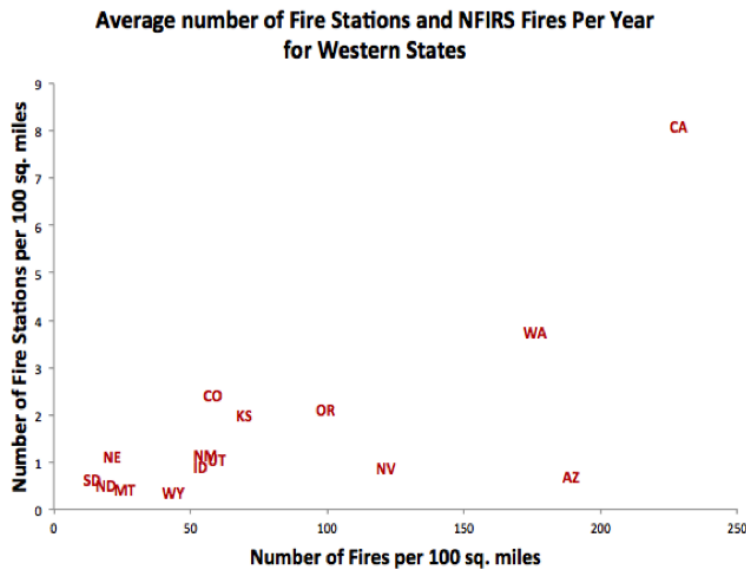
## Response Capacity, Limitations, Challenges

- Where is our capacity in relation to the workload?
- Where is our capacity limited and why?
- What are we currently doing to overcome our limits in capacity?
- Topography, road access, and response arrival time?



The Number of Fire Departments Map shows the number of stations per unit area, summarized at the county level. This shows the variation that exists in the number of fire stations across the West. Some counties have very low density of fire stations while others have a high density, resulting in a highly variable ability to respond to wildfire.

Figure 38. Western counties categorized by the mean number of fire stations per 100 square miles.



The scatter plot chart, figure 39, shows the number of fires per county plotted against the number of fire departments in a county. From the data it appears that workloads are not evenly distributed. California, Arizona and Washington have the highest number of fires per 100 square miles, and California and Washington have the highest number of fire stations. Nevada and Arizona have high numbers of fires, but low numbers of fire stations. Risk is characterized by local response workload in relation to existing and potential response capability.

Figure 39. Average number of fire stations and locally reported fires per year for Western states.

Fire data are from the Department of Homeland Security's National Fire Incident Reporting System (NFIRS), 2006-2010.

On the average, 95% of wildfire ignitions are suppressed at less than 300 acres by a combined force of closest appropriate resources (Report to WFLC, August 2004). This combined force may include federal, state, tribal, local, and private firefighters, working under the incident command system. Interoperability is a challenge that is being addressed. The firefighting response force has largely been preplanned based on the fuel, weather and topography, in consideration of the predetermined initial attack requirements of the primary agency having jurisdiction and the neighboring supporting or assisting agencies. Controlling unwanted fire in the initial attack phase has proven to be the safe and cost effective practice for the firefighters and the public. These forces are made up of ground and air tactical assets as well as supervisory overhead.

The federal response force has been determined by the agencies responsible for wildland fire management, and is funded through Congress. For example, tribal response forces are a part of the federal allocation. Tribes own fee parcels as well, and have rights and jurisdiction over tribal lands, territory, and resources. The nonfederal fire fighting force is either a state or a local resource funded and staffed by their jurisdiction based on the risk or standards that they have adopted. Mutual aid, automatic aid, and assistance for hire agreements may be entered that allow for reciprocal use or temporary use of resources belonging to different jurisdictions. Nonfederal firefighting resources are mostly staffed, equipped, and located based on structural fire response criteria. The categories of station location and staffing are typically commercial/industrial, urban, suburban and rural. The fire stations are denser in a commercial/industrial area, and become incrementally farther apart, with rural areas having the least number of fire stations per square mile.

## Fire Prevention and Evacuation Preparedness

The fire triangle is the controlling influence of all fire responders; the triangle consists of fuel, weather and topography with the additional variable of ignitions. The fuel or vegetation can be manipulated to reduce risk, and is part of a resilient landscape; the topography is a fixed variable over which we have no control. The weather is a variable that is predictable but not controllable. There are preventive measures that can reduce most human ignitions, but we cannot prevent all ignitions, and there are natural ignitions (lightning) that are predictable but not preventable.

Whenever the topography, fuel, weather, or number of ignitions exceed the capacity of the firefighting force that can be assembled, fires escape initial attack and move into a larger phase. It is the 5% of all fires that escape initial attack that account for over 90% of suppression funds used.

Firefighting forces include a fire prevention component that provides enforcement, education, and engineering services with a goal to reduce risk or ignitions, and improve public safety in the event of a fire. Examples include: engineering efforts may have a goal to reduce ignitions from power lines and railroads. The engineering component will assess risk from fire, and work to reduce those risks through vegetation management and weed abatement, to reduce the risk that a fire might spread into the community. Enforcement operations may target an arson problem or other intentionally set fires such as debris burning. The education component could include team teaching children about fire safety, or a community program such as Ready-Set-Go for preparedness in the event of a wildfire.

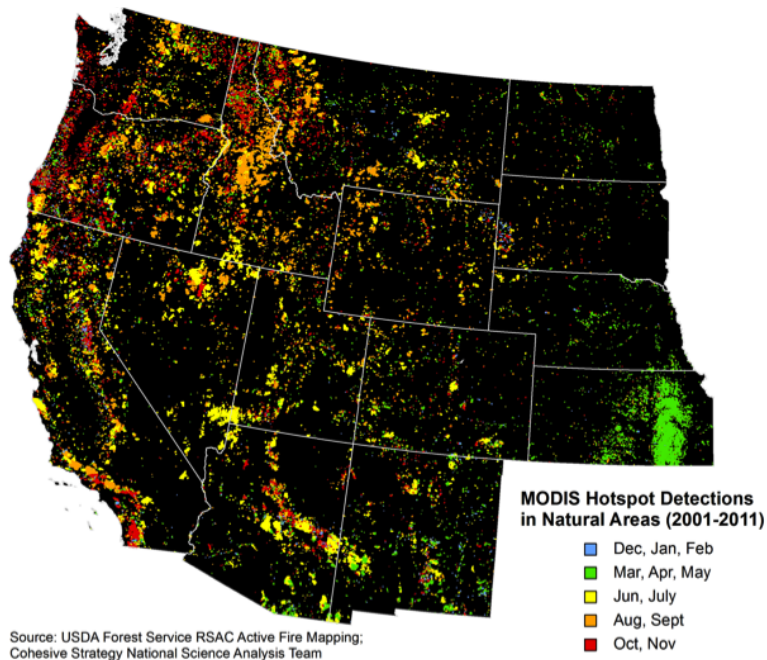
One area that contributes to risk is the need to develop a more comprehensive evacuation program for the West. Spontaneous evacuations may restrict responders and expose evacuees to accident and injury. Immediate evacuations ordered by the initial responder may pose hazards to responders and evacuees. Planned evacuations generally occur later in an incident, under more controlled circumstances. Repopulation of an area poses logistical and safety concerns involving many entities. The Ready-Set-Go program is intended to increase preparedness and reduce the hazards of evacuations.

## Response Capacity and Coordination

The Response system has evolved under the principle that no one agency is capable of managing the entire emergency workload alone. The resource augmentation processes consist of short term free assistance and long term assistance for hire agreements. These resources include: engines, crews and equipment, aircraft, and support assets.

Federal agencies participate in both forms of augmentation, short term free and long term assistance for hire. Wildfires on federal lands can be long in duration and require a larger firefighting force, resulting in the federal firefighting agencies hiring local and state resources to fill overhead and suppression positions.

The mobilization system that coordinates wildland firefighting resources has evolved and expanded to include filling orders for non-fire resources such as caterers, medical staff, logistical functions etc. The system has the ability to process requests and track resources across the country and around the world, and does so on a recurring basis. The response workload moves across the West as the weather changes, and the need moves as depicted in figure 40, showing hotspots by season.



**Figure 40. Seasonality of hotspots detected from space by the Terra and Aqua satellites since 2000.**

The majority of these hotspots are from wildfire, prescribed fire, and agricultural fires.

Source: USDA Forest Service Remote Sensing Applications Center.

If the coordination system did not exist one would be invented. The system that has been developed should not be duplicated nor reduced in its effectiveness.

Static firefighting resources are the fire engines and supporting resources normally assigned to a geographic location. Dynamic firefighting resources are fire engines, crews, aircraft, equipment, and supporting resources that are sent to assist in other geographic locations as necessary in response to an emergency or an anticipated emergency need.

The mobilization system has the capability to move resources, federal and nonfederal, in response to weather predictions such as lightning and high wind events. These short duration events can produce ignitions or fire rates of spread that will overload the static firefighting forces. Once the static resources are exhausted due to the number or severity of the fires, the coordination system will be used to bring in resources. The fires will grow in size as the augmented resources travel to the incidents, resulting in more damage and increased costs.

Static fire response was developed during different weather and climatic conditions. Today the fire seasons are longer and the fire problem is covering a larger geographic area.

Mobilizing nonfederal resources to a federal incident has fiscal, legal and qualifications challenges. One solution is to rely more heavily on the federal firefighting forces responding to the fire, to the point that all federal management units would have a minimum drawdown level of one fire engine remaining

on the unit. The one remaining federal fire engine would be augmented on initial attack by the neighboring mutual aid or assistance by hire resources. This practice would provide more federal resources on federal incidents, reducing the issue of qualifications and cost. This practice would allow local resources to perform their mission and assist as necessary on new fires locally.

*The USDA Forest Service Large Airtankers Modernization Strategy, Feb 2012* recommends the following:

- USFS and DOI should invest in the next generation of large airtankers;
- Explore flexibility and cost effective airtankers contracting;
- Federal aircraft should be a mix of types and sizes of fixed wing assets.

Findings include: Initial attack on new fires is critical to keep fires small. A 1.5% drop in the success rate of IA could equate to 150 additional fires over 300 acres for an additional \$300-450 million in suppression cost to the USFS. When multiplied by the Western Forestry Leadership Coalition 2010 analysis of the true cost of wildfires, which determined that indirect costs are 2 to 30 times the suppression costs. Therefore the \$300 million in added suppression costs could equate to \$1.2 billion to \$8.7 billion increase added cost to the community of the true cost of wildfire.

## Protection Values and Incident Prioritization

Protection values and the complex interagency nature of response capability help us to define a pre-determined response. Typically the incident response is dictated by where it is, what is at risk, the existing fire potential, and available response forces. This works well when very few incidents occur at one time. When we anticipate that we may exceed response capability, the need to prioritize incidents increases. Those priorities are normally protection of life, including responder and public safety, as well as the density of affected populations. The next consideration is initial attack. The next priority for the interagency group is typically protection of residences, followed by high value assets, either natural or infrastructure. In a given similar fire situation, we would prioritize the fire with the highest values at risk.

This system is logical, yet often causes us to have larger remote fires on the rural landscapes because of the lower affected population. This often contributes to large, extended attack fires that eventually require an extended commitment of responders for long durations in large, heavy fuels, for weeks or months at a time.

The risk to fire adapted communities has been characterized at the broad level, using information related to factors that influence risk, with county level information. Integrating the many layers of information through available models allows decision makers to better understand what is likely to influence risk and where opportunities to reduce and manage risk might be effective. Decision makers should use the relationships among the various ecological, social, and fire behavior information to examine options to focus energy toward reducing risk. Windowing down with more detailed analyses, at a community level scale, will prove useful in addressing the specific risks within counties. The broad scale information provides the context within which finer resolution decision making can be most effective. As has been demonstrated, collaborative efforts are most likely to yield positive outcomes for communities at risk.



# Measuring Progress Toward the Goals

In Phase I national goals and performance measures were established. The goals are ideals that we hope to approach by taking the specific actions that will be described in the regional and national action plans. It is assumed that if we can restore and maintain landscapes, and create more fire adapted communities and improve fire response, then we will be able to rein in escalating wildfire suppression costs. The national goals and performance measures are broad, and they should be further refined with objectives and actions by the regional strategy committees. As work progresses with the Cohesive Strategy and the development of the Action Plan, the WRSC will address regional performance measures. This is the next step in the Cohesive Strategy process.

## National Performance Measures

### These are the National Goals and Performance Measures:

**Restore and Maintain Landscapes: GOAL:** *Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.*

Outcome-based Performance Measure:

- Risk to landscapes is diminished.

National output-based metrics, in support of the national measure, will center on risk to ecosystems at landscape scales.

**Fire Adapted Communities: GOAL:** *Human populations and infrastructure can withstand a wildfire without loss of life and property.*

Outcome-based Performance Measure:

- Risk of wildfire impacts to communities is diminished.
- Individuals and communities accept and act upon their responsibility to prepare their properties for wildfire.
- Jurisdictions assess level of risk and establish roles and responsibilities for mitigating both the threat and the consequences of wildfire.
- Effectiveness of mitigation activities is monitored, collected and shared.

National output-based metrics will include indicators relevant to communities with mitigation plans and planned or completed treatments.

**Wildfire Response: GOAL:** *All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.*

Outcome-based Performance Measure:

- Injuries and loss of life to the public and firefighters are diminished.
- Response to shared-jurisdiction wildfire is efficient and effective.
- Pre-fire multi-jurisdictional planning occurs.

National output-based metrics will reflect trends in changing risk to support the national measure. Indicators will include pre-season agreements and annual operating plans, integrated wildfire response scenarios, and shared training. Risk exposure to firefighters will be based on a balanced consideration of values protected and the probability of success.

## How Decision-makers Can Use the Alternatives

As the alternatives, actions and activities are presented to local decision makers, particularly at the county level, CWPPs (or their equivalent) should be developed and modified to reflect priorities determined by the local entity. In alignment with local community values and land management objectives, the various actions associated with these alternatives should help to guide practical and sensible decision-making. Collaborative groups that encompass larger areas, outside of a county geographic boundary,

are a valuable tool when discussing priorities at the landscape level. Collaborative groups have proven to be successful in identifying priority treatment areas and leveraging resources to accomplish hazardous fuels reduction treatments, as well as larger scale forest restoration and management across the landscape. Collaborative groups can also help to develop alternatives and priorities that are acceptable, especially in multi-jurisdictional landscapes, to present to local, tribal and state decision makers.

In the attempt to provide a higher level of wildfire protection for their community, many localities will find reduction of hazardous fuels on both private and public lands to be a very high priority. To achieve favorable results, it is often most productive to determine the best method of performing such tasks through collaborative efforts. In many cases, the most efficient of these methods could be through active forest management- commercial timber and salvage sales, and/or prescribed fire, which improve forest health and can provide economic opportunities, including biomass utilization. Although this may be simply accomplished on private, tribal, or state lands, it should be recognized that laws applying to federal lands would complicate, delay, or even preclude such activities. Fully implementing all existing federal authorities such as the Healthy Forest Restoration Act and Categorical Exclusions should be considered to accomplish landscape level treatments to restore forest health. Local governments, private forestland owners, interested parties, state agencies and federal agencies are encouraged to participate with collaborative efforts to expeditiously find local solutions that address barriers and reduce risk to communities.

It is anticipated that the Cohesive Strategy and the datasets and maps collected by the NSAT will influence the cascade of decisions that flow from the Western recommendations aimed at achieving the three broad goals. The information, data, and models developed through the Cohesive Strategy can be used to further explore options to address risk at multiple scales. The strength of the information lies primarily in its further use as opposed to any individual report that may be developed.

Federal decision makers from national, regional, and local levels should use the data, models, and recommendations of the Cohesive Strategy to inform their decisions. The expectation also exists that decision makers within the state agencies, tribal organizations, and non-governmental organizations should also use the data, models, and recommendations to inform their decisions. Where collaborative groups are already engaged in discussing solutions to wildfire risks in regional, state, or local areas there is an expectation that the Cohesive Strategy information will inform their discussions. The process for use of the information should be within the context of risk assessment and decision-making. The county-level information that has been assembled in support of the Cohesive Strategy along with the models set the stage for additional analyses that can assist decision-makers with setting context, considering priorities, and examining potential emphases.

There can be no standard approach that will be the best approach in all areas. The alternatives can and should be used to evaluate procedures and methods to achieve local priorities as outlined and delineated in CWPP's and through collaborative groups. As such, specific actions from the alternatives should inform decision-makers as they develop the most effective approach to accomplish local priorities across the landscape.

# Recommendations

---

The WRSC reviewed the risk analysis in light of the three goals and the three alternatives. They found merit in many different recommendations put forward by the planning groups and analysts. Some recommendations were overarching recommendations that addressed the entirety of wildland fire issues. Some crossed over between focus areas, such as a recommendation for population protection plans in CWPPS for communities at risk, which could be either in the domain of fire adapted communities or fire response. And some recommendations came out of one group, but were appropriate for all aspects of the Cohesive Strategy, such as the recommendation by the landscape resiliency group that collaborative groups be involved in decision making. All of the recommendations are broad-based.

Here are key recommendations put forward by the WRSC. Details on how these recommendations will be carried forward and fully developed in the Regional Action Plan is described in the Next Steps section.

## Overarching Recommendations

- Recognize the depth and importance of the communications framework and provide resources to implement communications recommendations, as it establishes the foundation of our collaborative process.
- Ensure the coordinated implementation of the Cohesive Strategy among all stakeholders.
- Enhance collaboration through incentives.
- Emphasize landscape treatments where existing collaborative groups have agreed in principle on management objectives and areas for treatment, and encourage and facilitate the establishment of collaborative groups.
- Expand collaborative land management, community and fire response opportunities across all jurisdictions, and invest in programmatic actions and activities that can be facilitated by Tribes and partners under the Indian Self-Determination and Education Act (as amended), the Tribal Forest Protection Act, and other existing authorities in coordination with the UN Declaration on the Rights of Indigenous Peoples.
- Address identified barriers and promote critical success factors across the region and at all levels.
- Provide resources to support local government officials, such as fire chiefs, in the integration of the Cohesive Strategy into their communities and operations – i.e., support the development of an International Association of Fire Chiefs (IAFC) Leaders' Guide for the Cohesive Strategy.
- Formalize a comparative risk model that includes federal, state, and local costs. Use the model to complete a trade off analysis and establish a risk base point.
- Establish the use of the model, including training and data descriptions for local decision makers, such as counties. Facilitate local updates to the models to enable updates to the national models.
- Identify data gaps and inconsistencies, including describing the purpose of the data in monitoring and evaluating progress to accomplishing the goals of the Cohesive Strategy. Prioritize action toward addressing gaps and inconsistencies.

## Landscape Resiliency Recommendations

- Encourage US Forest Service and Department of the Interior/Bureau of Land Management to use existing authorities under Healthy Forest Restoration Act, Healthy Forest Initiative, and other contracting authorities to expedite fuels treatments. Assess what is currently being spent on these tools and increase that amount. Project criteria to be worked out during action planning may include: Project has to be 5,000 acres or larger, reduces risk to landscapes and/or communities by focusing on areas that have a high burn probability or departure; has to be initiated within 2 years; and is based on collaborative processes.

- Explore data to identify and prioritize landscapes for treatment. This information would be provided to sub-geographical stakeholders, decision makers, as well as state and federal officials for their consideration and use.
- Expedite coordinated identification, prioritization, and restoration of damaged landscapes as a result of natural disturbances including, insect/disease, hurricanes, wildfire, invasives, changing climatic conditions. Identify where investments are not likely to restore areas to assist in prioritization of resources.
- Work with Council on Environmental Quality (CEQ) in developing categorical exclusions for landscape restoration.
- Where appropriate, utilize CEQ alternative arrangements when restoring damaged landscapes as a result of natural disturbances.
- Examine legislative related barriers that are impeding implementation of collaboratively developed landscape health related projects and pursue reform of the existing process to increase our effectiveness in active forest and rangeland management. (e.g., Endangered Species Act, Equal Access to Justice Act, National Environmental Policy Act (NEPA)). Encourage and enlist local, state, tribal, and federal environmental regulatory agency representatives to participate actively in collaborative efforts to restore resilient landscapes.

### *Fire Adapted Communities Recommendations*

- Accelerate achievement of fire adapted communities using existing tools; offer incentives, such as chipping/disposal and incentives for collaboration, etc.
- Enhance campaigns to educate the public about the urgent need for homeowners to take action, including having statewide, Western, and other coordinated campaigns. Use videos such as how to protect homes from fire, the importance of fire in nature, and the need to live with fire.
- Facilitate shared learning among communities for fire adaptation.
- Continue to create and update Community Wildfire Protection Plans (CWPPs) using Secure Rural Schools Community Self-Determination Act and identify new funding sources. Be sure to include offices of emergency management and local response entities, such as the sheriff's office in planning efforts. Update CWPPs in areas that have had a wildfire event.
- Review and modify requirements for technical and financial support of communities through Federal Emergency Management Agency (FEMA), i.e. NEPA administrative processes, and applications for funding.
- Develop and promote local collaborative capacities to implement fuels treatments and respond to fires.

### *Fire Response Recommendations*

- Improve response effectiveness by convening state level groups to identify where fire protection exists for all areas within each state. Eliminate unprotected areas by establishing/extending jurisdictional responsibilities. Response cooperators in each state should identify those voids and negotiate to ensure that every acre within the state has designated protection. Promote realignment of protection responsibilities to the organization that is best suited to provide protection (e.g., block protection areas, offset protection agreements, protection contracts).
- Improve firefighter and public safety. Maintain and/or improve an aggressive human caused ignition prevention program. Involve all stakeholders in the prevention campaign.
- Integrate local, state, federal, and tribal response capacity. Identify where the greatest opportunities exist in communications, training, qualifications, mobilization, and instruments.
- Increase capacity where necessary in order to improve overall local response effectiveness and reduce the need for external (non-local) resources.



## Next Steps

---

Phase III will continue with development of a national risk analysis and a national action plan. The NSAT will develop a comparative risk model using the data sets, and will develop a national trade-off analysis. When the comparative risk and trade-off analyses are complete, a National Phase III Risk Analysis Report will be written to bring together the issues and alternatives discussed in the three regional reports. A National Action Plan will be developed based on the national risk and trade-off analyses.

As stated previously in the report, the Western Region is tremendously diverse, both physically and socially. As a result the region is not well suited to a monolithic implementation of a detailed list of actions. However, given the similarities the region shares; such as large natural landscapes dominated by federal ownership and the presence of large catastrophic wildfire; it is well suited for implementing actions, decided upon at a local or state level, that are in concert with the goal areas of the Cohesive Strategy.

The challenge is how to enable the local decision making process to be made within the framework of the Strategy. It is clear that directing or attempting to regulate local and state level decision processes is doomed to fail, and is not the most sustainable approach to achieving “cohesive action”. The path forward seems to come from one of the foundational components discovered in the development of the Strategy – *collaboration*.

In order to sustain the momentum gained while developing the strategy, we must facilitate and expand collaboration in decision making at all levels, and at multiple scales, within the Western Region. Experience has shown us that collaboration does not spontaneously happen. It requires structure, process, focus, and resources. To that end, the next step is to establish a coordination structure that will exist under the umbrella of the Wildland Fire Executive Council (WFEC). This structure will facilitate the broad scale implementation of the recommendations and strategy identified in the Western Regional Report.

It is envisioned that the structure will be a coordinating body, composed of representatives of the decision making and jurisdictional authorities in the West. The coordinating body will be supported by a full time staff lead to assist in the continued engagement of stakeholders throughout the development and implementation of a Western Regional Action Plan. The group will focus on identifying priorities and emphasis areas among the recommendations, identifying solutions to break down barriers, and identifying actions for exploration. They will seek outcomes that are measurable at the regional, state, county, community, and individual property owner levels.

To facilitate implementation, this coordinating body will need resources to provide regional coordination and a communications component. It is recommended that these resources be acquired through new or existing agreements with the Western Governors' Association and/or Western Forestry Leadership Coalition. The objective of the coordinating body will be to facilitate coordinated development and implementation of actions, provide consistent communications with stakeholders, and to foster tools and information to enhance local, state, and regional decision making.

The creation of the Western Regional Action Plan is fundamental to achieving the goals of the National Cohesive Wildland Fire Management Strategy in the West. The WRSC recognizes that the Cohesive Strategy efforts to-date have been very successful. Continued success will rely on a commitment of support, the allocation of assets and resources, and a coordinated, collaborative approach with stakeholders - at all levels. The Action Plan will not restrict or direct local authorities and associated collaboratives in their decision-making.

The FLAME Act requires a five-year update to the Cohesive Strategy. However, the WRSC sees a need for the Action Plan to be more dynamic than that. It will need to change over time, as conditions or other factors (i.e. large fire seasons, economics, insects and disease outbreaks, etc.) warrant such change. Unless otherwise directed, it is the intent of the WRSC to continue operations and move forward with the implementation of our recommendations, action plans, etc. without interruption.

# Western Regional Science-Based Risk Analysis Report Appendices

## Appendix 1 - Glossary

The National Wildfire Coordinating Group (NWCG) maintains an extensive glossary of fire management terminology and acronyms (found at [www.nwcg.gov/pms//pubs/glossary/index.htm](http://www.nwcg.gov/pms//pubs/glossary/index.htm)). Some terms used in this document that have specific meaning in the context of wildland fire management, but are not found in the NWCG glossary are defined below.

**Affected party** A person or group of people who are affected by the outcome of a decision or action

**Biomass** Any organic matter that is available on a renewable or recurring basis. Under the Farm Security and Rural Investment Act of 2002 (Title IX, Sec. 9001), biomass includes agricultural crops, trees grown for energy production, wood waste and wood residues, plants (including aquatic plants and grasses), residues, fibers, animal wastes and other waste materials, and fats, oils, and greases (including recycled fats, oils, and greases), but not recycled paper or unsegregated solid waste. (From Farm Bill Glossary on the National Agricultural Law Center Web site <http://nationalaglawcenter.org/#>.)

**Fire-adapted community** Human communities consisting of informed and prepared citizens collaboratively planning and taking action to safely coexist with wildland fire.

**Fire-adapted ecosystem** An ecosystem is *"an interacting, natural system, including all the component organisms, together with the abiotic environment and processes affecting them"* (NWCG Glossary). A fire-adapted ecosystem is one that collectively has the ability to survive or regenerate (including natural successional processes) in an environment in which fire is a natural process.

**Fire community** Collectively refers to all those who are engaged in any aspect of wildland fire-related activities.

**Fire exclusion** Land management activity of keeping vegetation or ecosystems from burning in a wildland fire.

**Fire management community** A subset of the fire community that has a role and responsibility for managing wildland fires and their effects on the environment [according to the Phase I report glossary].

**Fire science community** Subset of the fire community consisting of those who study, analyze, communicate, or educate others on the components of fire management that can be measured, such as fire behavior, fire effects, fire economics, and other related fire science disciplines.

**Fragmentation** Physical process whereby large, uniform areas are progressively divided into smaller fragments that are physically or ecologically dissimilar. Fragmentation can occur through natural disturbances such as wildfire, or more commonly, through land use conversion by humans (e.g., urbanization).

**Landscape resilience** The ability of a landscape to absorb the effects of fire by regaining or maintaining its characteristic structural, compositional and functional attributes. The amount of resilience a landscape possesses is proportional to the magnitude of fire effects required to fundamentally change the system.

**Middle Ground or Middle Lands** Those nearby areas that contribute to the identity, structure, culture, organization, and wellbeing of a community, and are often considered essential to its economic, social, and ecological viability.

**Parcelization** Process of subdividing a large, intact area under single ownership into smaller parcels with multiple owners. The term can also apply to an administrative process of dividing a landscape into multiple management units with different management objectives. Parcelization is often a precursor of fragmentation because of differences in management priorities among property owners.

**Silviculture** *“The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis”* - definition from John A. Helms, ed., 1998. *The Dictionary of Forestry*. The Society of American Foresters, Bethesda, Maryland.

**Stakeholder** A person or group of people who has an interest and involvement in the process and outcome of a land management, fire management, or policy decision.

**Traditional Ecological Knowledge**, also called by other names including Indigenous Knowledge or Native Science, (hereafter, TEK) refers to the evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment. This knowledge is specific to a location and includes

The relationships between plants, animals, natural phenomena, landscapes and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry. TEK is an accumulating body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (human and non-human) with one another and with the environment. It encompasses the worldview of indigenous people, which includes ecology, spirituality, human and animal relationships.

**Viewshed** An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point.

## Appendix 2 - Acronyms

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CAR	Community at Risk
CRAFT	Comparative Risk Assessment Framework and Tools
CS	Cohesive Strategy
CSSC	Cohesive Strategy Subcommittee
DOI	Department of the Interior
EMDS	Ecosystem Management Decision Support System
EPA	Environmental Protection Agency
FACA	Federal Advisory Committee Act
FEMA	Federal Emergency Management Agency
FFT2	Firefighter 2
FLAME Act	Federal Land Assistance, Management and Enhancement Act of 2009
FLN	Fire Learning Network
FPA	Fire Program Analysis
FPU	Fire Planning Unit
GACC	Geographic Area Coordinating Center
GAO	General Accountability Office
HFI	Healthy Forests Initiative
HFRA	Healthy Forests Restoration Act
HVR	Highly valued resource
IAFC	International Association of Fire Chiefs
ICS	Incident Command System
IQCS	Incident Qualification and Certification System
ITC	Intertribal Timber Council
JFSP	Joint Fire Science Project
LLMPs	Land Management Plans
LRMPs	Land and Resource Management Plans

MOU	Memorandum of Understanding
NACo	National Association of Counties
NASF	National Association of State Foresters
NEMAC	National Environmental Modeling and Analysis Center (UNC Asheville)
NEPA	National Environmental Protection Act
NFPA	National Fire Protection Association
NGO	Non governmental organization (e.g. nonprofit)
NICC	National Interagency Coordination Center
NIFC	National Interagency Fire Center
NLC	National League of Cities
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
OMB	Office of Management and Budget
PPE	Personal protective equipment
QFR	Quadrennial Fire Review
RFA	Rural Fire Assistance
RFD	Rural fire department
RSC	Regional Strategy Committee
SFA	State Fire Assistance
TNC	The Nature Conservancy
USDA	U.S. Department of Agriculture
USFS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VFA	Volunteer Fire Assistance
VFD	Volunteer fire department
WFDSS	Wildfire Decision Support System
WFEC	Wildland Fire Executive Council
WFLC	Wildland Fire Leadership Council
WG	Working Group
WGA	Western Governors' Association
WRSC	Western Regional Strategy Committee
WUI	Wildland Urban Interface

### Appendix 3 - References and Bibliography

Dale, Lisa, *"The True Cost of Wildfire in the Western U.S."*, Western Forestry Leadership Coalition, April 2010, [http://www.wflccenter.org/news\\_pdf/324\\_pdf.pdf](http://www.wflccenter.org/news_pdf/324_pdf.pdf)

Goulette, Nick, *Living With Wildfire: State of Practice in Western Communities*. An assessment for the Western Regional Strategy Committee for the National Cohesive Wildland Fire Management Strategy, 2012, See Appendix 6.

Jakes, PJ and Sturtevant, V, *The Role of Adaptive Capacity in Creating Fire-Adapted Human Communities* JFSP ID#10-3-01-7, 2010, [http://www.firescience.gov/projects/10-3-01-7/project/10-3-01-7\\_final\\_report.pdf](http://www.firescience.gov/projects/10-3-01-7/project/10-3-01-7_final_report.pdf).

Jakes, PJ and Sturtevant, V, *Trial by Fire: Do Community Wildfire Protection Plans Contribute to Wildfire Response and Recovery?*, JFSPID#10-3-01-7, 2012

McCaffrey, S., Olsen, C *Research Perspectives on the Public and Fire Management: A Synthesis of Current Social Science on Eight Essential Questions: Final Report to Joint Fire Science Program and Partners in Education (PIFE)*, Gen. Tech. Rep. NRS-104. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station, 2012 <http://nrs.fs.fed.us/pubs/41832>.



Noonan, Curtis, et al, Biomass smoke exposures: Health outcomes measures and study design, *Inhalation Toxicology*, 2009, 1-5, [http://www.cdc.gov/nceh/airpollution/airquality/pdfs/mtbiomass\\_conference\\_health\\_outcomes.pdf](http://www.cdc.gov/nceh/airpollution/airquality/pdfs/mtbiomass_conference_health_outcomes.pdf).

Plewe, Brandon, *A linguistic map of Native North America*, 1996, <http://www.hartford-hwp.com/archives/41/048.html>.

Pope CA, Ezzati M, Dockery DW. Fine Particulate Air Pollution and Life Expectancy in the United States. *New England Journal of Medicine*, 2009; 360:376-86.

Renner, C. *Community Wildfire Protection Planning to Protect Landscapes and Communities: CWPPs and the Middle Ground*. Report to the Western Regional Strategy Committee for the National Cohesive Wildland Fire Management Strategy, 2012. See Appendix 6.

Randall, Christina, Colorado Springs Fire Department, email to Cheryl Renner, September 24, 2012

Renner, C, Haines, T and Reams, M, *Better Building Blocks*, Wildfire Magazine, International Association of Wildland Fire, March 2010, <http://wildfiremag.com/pub-ed/wildfire-mitigation-results-201003/>.

Strategic issues panel on fire suppression costs, *A report to the wildland fire leadership council*, August 26, 2004, [http://www.fs.fed.us/fire/ibp/cost\\_accounting/costmanagement\\_aug\\_04.pdf](http://www.fs.fed.us/fire/ibp/cost_accounting/costmanagement_aug_04.pdf)

The Nature Conservancy, *Fire, Landscapes and People, Final Report: Fire Learning Network*, 2011, <http://www.conservationgateway.org/Files/Pages/fire-landscapes-people-fiaspx55.aspx>

USDA Forest Service *Large airtanker modernization strategy*, February 10, 2012 [http://www.fs.fed.us/fire/aviation/airtanker\\_modernization\\_strategy.pdf](http://www.fs.fed.us/fire/aviation/airtanker_modernization_strategy.pdf)

US Forest Service Northeast Research Station, *Helping Communities Take Charge of their Wildland fire Safety*, Research Review, Vol. 17, Summer 2012

US Forest Service, *Major Forest Insect and Disease Conditions in the United States: 2011*, United States Department of Agriculture Forest Service, FS-1000 June 2012.

Western Governors' Association, *Forest Health Landscape-scale Restoration Recommendations*, Forest Health Advisory Committee, December 2010, <http://westgov.org/initiatives/foresthealth>.

William, D, et al, *Community Wildfire Protection Planning: The Importance of Framing, Scale, and building Sustainable Capacity*, Journal of Forestry, Society of American Foresters, January 2012.

## Appendix 4 - Science and Models

### Data and Methods for Exploring Opportunities to Reduce Risk

#### Introduction

Wildland fire is a complex issue that involves multiple interacting factors spanning the natural, human, and built environments. During Phase II, the National Science and Analysis Team (NSAT) examined various aspects of wildland fire and developed conceptual models specific to each component. The purpose of these models was to display the interactions and relationships among factors, such as the relationship between fuel treatments and the extent and intensity of wildfire. The NSAT also identified various data sets that might be used in Phase III to build analytical models consistent with the concepts articulated in Phase II. Building on these efforts, Phase III has involved an extensive effort to collect data necessary to quantify relationships and provide a rigorous examination of risk.

The types of data collected can be broadly categorized into five general types: biophysical, socioeconomic, land-use and ownership, wildfire frequency and extent, and incident response. Biophysical variables include physical measures such as precipitation, temperature, and terrain. They also include characteristics of vegetation that contribute to wildfire behavior. Socioeconomic variables describe the demographic and economic characteristics of populations and communities within each county, and also describe the distribution of homes within the wildland-urban interface. Land-use and ownership describes the mixture of public and private lands and also helps quantify the extent to which lands might be suitable for active management, e.g., by highlighting areas that historically supported timber harvest. Variables describing wildfire frequency and extent have been gathered from various reporting systems that have been put in place by federal, state, and local fire departments. They also include data from independent monitoring systems that track wildfire using satellites and other remote devices. Finally, they include a series of modeled products from governmental and private entities. Similarly, incident response information has been gathered from many of the same reporting systems. These variables track who responded to wildfire, how long they took to arrive on site, and how long was required before the fire was contained. Information on injuries and casualties can also be found in these same reporting systems. All of the variables available for use in the Phase 3 analyses are listed in Appendix A.

Before data were used in analysis, three additional steps were accomplished. The first step was one of quality control. Obvious errors in the data were corrected where it was apparent that the corrections would enhance the fidelity of the original data. In some cases limited numbers of observations were omitted from further consideration due to obvious mistakes that could not be corrected or missing information. The second step involved compiling, reformatting, or summarizing data to fit within a common sampling frame—the county. For some data sets, for example many of the social economic variables, data were originally provided at the county level and no reformatting was necessary. Other, higher-resolution data were processed using GIS techniques to provide a county-level summary. Many data were also normalized to provide comparative area-based or incident-based metrics such as acres burned per hundred square miles or firefighter injuries per 1000 incidents.

The third step in data preparation involved filtering and consolidation. In this step, a preliminary correlation analysis was used to identify common patterns among the data that allowed a subset of the data to be used to characterize conditions efficiently. That is, a smaller set of variables were identified that were highly correlated with other variables and could be used alone without significant loss of information. Statistical techniques including factor analysis and clustering were used to reduce the number of variables further by creating super variables that were either linear combinations of other variables (from factor analysis) or categorical groupings of counties based on their similarities (using cluster analysis). The combination of filtering and consolidation techniques allowed the total number of variables considered to be reduced by nearly 2/3. Even so, there were over 100 variables available for potential analysis.

### *Modeling*

Various analytical models were constructed for the primary purpose of relating causal or contributing factors to variables which collectively index levels of risk. These risk metrics include measures of hazard such as frequency and magnitude of wildfire, any direct measures of loss or injury, and various measures related to exposure, such as the number or density of homes in the wildland-urban interface. Although hazard and loss are often combined into single measures of risk, such measures were not constructed in our analysis due in part to the county-level resolution of the original data. For example, we know that there are homes distributed throughout the wildland urban-interface and large wildfires are likely within the county, but we cannot tell which portion of the county is most likely to experience wildfire or which off-site effects of wildfire might be relevant to overall impacts. Such spatial interactions are important for producing an accurate and precise estimate of risk. Lacking more specific information, we use a more straightforward and simple assumption that the total risk is proportional to county-level hazard, exposure, and potential loss.

Within the Western Region, we found that the most useful indices of risk were the following: vegetation and fuels maps, the causes of fire starts, the locations of fire departments, and the counties and communities with CWPPs and ordinances.

Many of the analytical models used in our analysis were constructed using Bayesian networks. Bayesian networks are decision analysis tools that use conditional probabilities to link variables together and express the degree of relationship between them. They provide a highly flexible modeling environment that works equally well with simple and complex problems. Here, we use a simple example using climate, fuel, and wildfire to illustrate the basics behind a Bayesian network. Consider the two graphs shown in Figure 1. In the first graph on the left, it is assumed that climate affects both vegetation (fuels) and wildfire, but vegetative fuels and wildfire are independent given climate (i.e., there is no connection between fuels and wildfire that does not pass through climate). The second graph uses the same three nodes, but specifies a different relationship in that vegetative fuels and wildfire are both related to climate, but vegetation has an additional direct on wildfire. The principal difference in the two graphs is that the first graph suggests that manipulation of vegetation would have no measurable effect on wildfire. Only by changing climate could one expect wildfire to change. In contrast, the second graph allows for changes in vegetation to have an effect on wildfire independent of changes in climate. Importantly, quantitative models based on either graph could be based on exactly the same data, but they would have very different implications for management.

Bayesian networks begin with graphs like these, but then quantify the relationships using empirical data or expert opinion. Each node in the network can be represented by a single quantitative variable. Arrows are used within the Bayesian networks to identify conditional dependencies, much as the arrows in the graph above are used to relate one variable to another. The direction of the arrows are important, in that they indicate causal dependencies as well as determine how information can flow from one node to another. In this context, information is defined explicitly as that which causes a change in probability assignment. To facilitate calculation—as well as communication—continuous variables are often broken into discrete classes; discrete or categorical variables require no such modification.

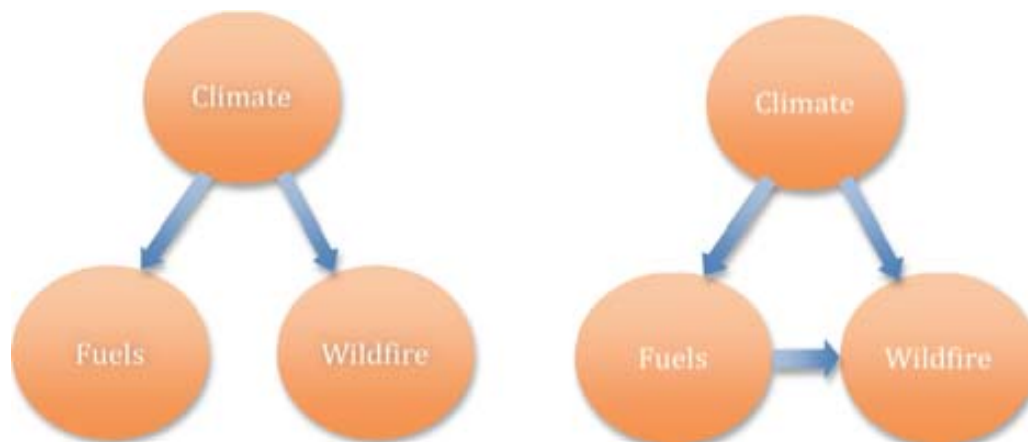
As an example, consider the Bayesian network shown in Figure 2 and Figure 3. This simple network has three nodes: Region, Annual Ignitions, and Normalized Area Burned. Region simply refers to the three regions identified within the Cohesive Strategy. Annual Ignitions is the mean number of outdoor fires reported per year, summed from three separate reporting systems representing federal, state, and local response units. Normalized Area Burned is an estimate of the expected number of acres burned in these reported incidents during a high-fire-occurrence year (i.e., the 95th percentile). This network was parameterized (trained) using data from all of the counties in the conterminous United States (lower 48 states), where each county was treated as a single observation and weighed equally regardless of area. The unconditional network (Figure 2) shows the marginal distributions of the values of each variable. One can see from the probability histograms, for example, that 33.4% of the counties are in the Northeast, 15% of the counties reported between 50 and 75 outdoor fires per year, and 14.3% of the counties might expect to burn 2000 or more acres (much more in some counties) in a bad wildfire year. Conditioning on region (Figure 3) provides a quick visual comparison of the differences among regions. For example, the West stands out in that it has a higher than normal percentage of counties with relatively few incidents, but also higher than average numbers of counties with very high expectations for area burned.

The Bayesian networks constructed for our analyses are necessarily more elaborate than the simple graphs depicted above, but they use the same basic concepts. For example, the network depicted in Figure 4 uses logic similar to Figure 1 regarding the relationship between climate, fuels, and wildfire, but expands that concept by using multiple nodes or variables for each component. This particular network uses three super variables (*Warmness Factor 1*, *Wetness Factor 2*, and *Terrain Factor 3*) from a factor analysis of physical attributes including seasonal precipitation and temperature, elevation, and slope, and regional cluster analyses of vegetation and surface fuels. It also includes Region, Annual Ignitions, and Normalized Area Burned from Figures 2 and 3, and additional nodes from an independent modeling exercise, Mean Burn Probability and Mean Flame Intensity. A primary difference between

the networks in Figure 4 and Figure 2 is the relationship between Region and Normalized Area Burned now passes through a series of intermediate nodes related to climate and vegetation, which allows for greater exploration of the causal factors influencing area burned by wildfires.

Five basic models or templates were created for use by the WRSC in order to explore opportunities for reducing risk. They are described only briefly here. The first was an Ignition Model, which focused on understanding where human-caused wildfire ignitions occurred and where they might be reduced through targeted actions at preventing either accidental or intentional ignitions alone or in combination. The second template—Fire, Fuels, and Homes—explored the intersection of homes and wildfire and included variables that might suggest where either mechanical treatments or prescribed fire might be productively employed to alter the composition of surface fuels and affect wildfire behavior. Conversely, they could also be used to identify areas where such options are problematic. The third template—Prescribed Fire and Ecological Resiliency—focused more on the potential application of prescribed fire in areas removed from human communities where the primary goal might be to restore a fire regime more consistent with historical conditions. Fire Adapted Communities formed the basis of the fourth template, which used information about current programs to suggest the extent to which evidence of local actions are tied to socioeconomic factors as well as to factors more directly indicative of risk to human communities from wildfire. Finally, the fifth template emphasized Incident Response Capacity and Workload. The purpose of this template was to help understand the relative contribution of federal, state, and local departments to incident response and explore the factors contributing to variation in response metrics such as arrival and containment time and fire size.

These templates and associated data were customized for each region and shared with the regional work groups during a workshop in Denver in early September. Ensuing discussions with each workgroup led to the creation of a series of summary tables, graphs, and maps that highlighted findings relevant to objectives and goals articulated by each region. These summary products have been incorporated in the regional reports as noted.



**Figure 1. Simple graphical models of two possible hypotheses of the relationships among climate, vegetative fuels, and wildfire.**



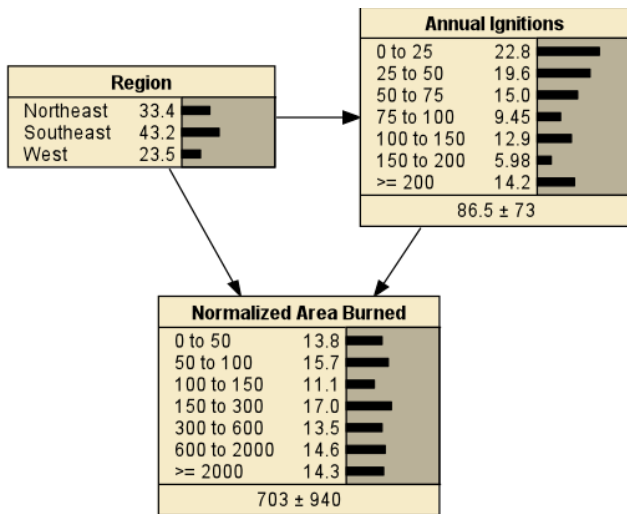
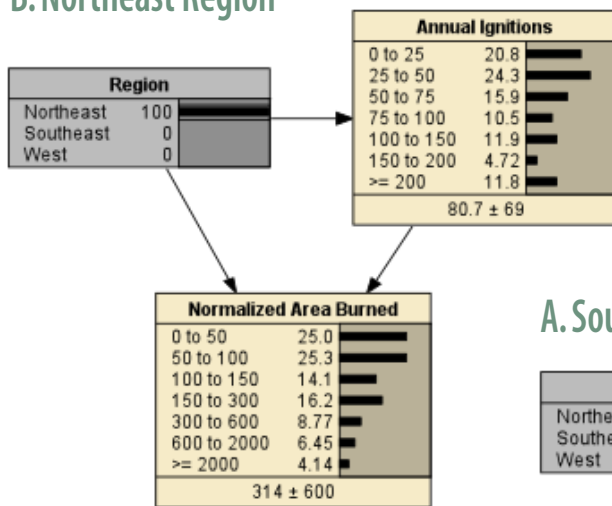
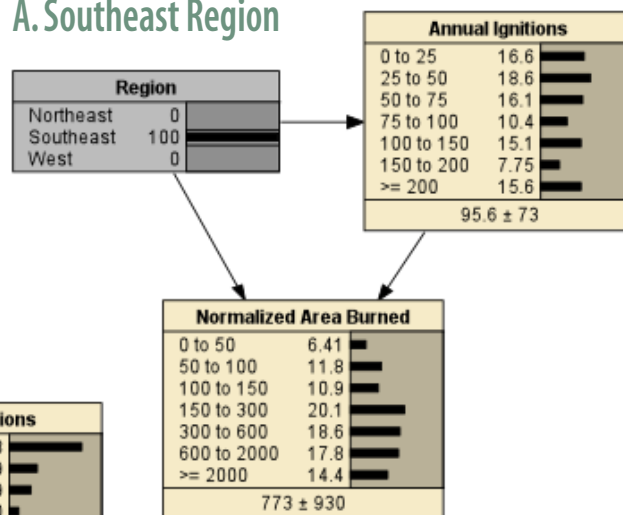


Figure 2. Simple Bayesian network illustrating the relationships among Cohesive Strategy *Region*, Annual Ignitions, and Normalized Area Burned. Probability histograms represent the percent of the counties within the conterminous United States within each class.

## B. Northeast Region



## A. Southeast Region



## C. Western Region

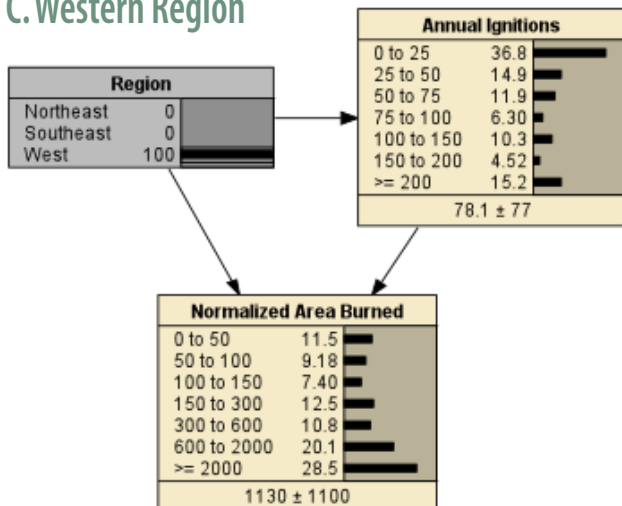
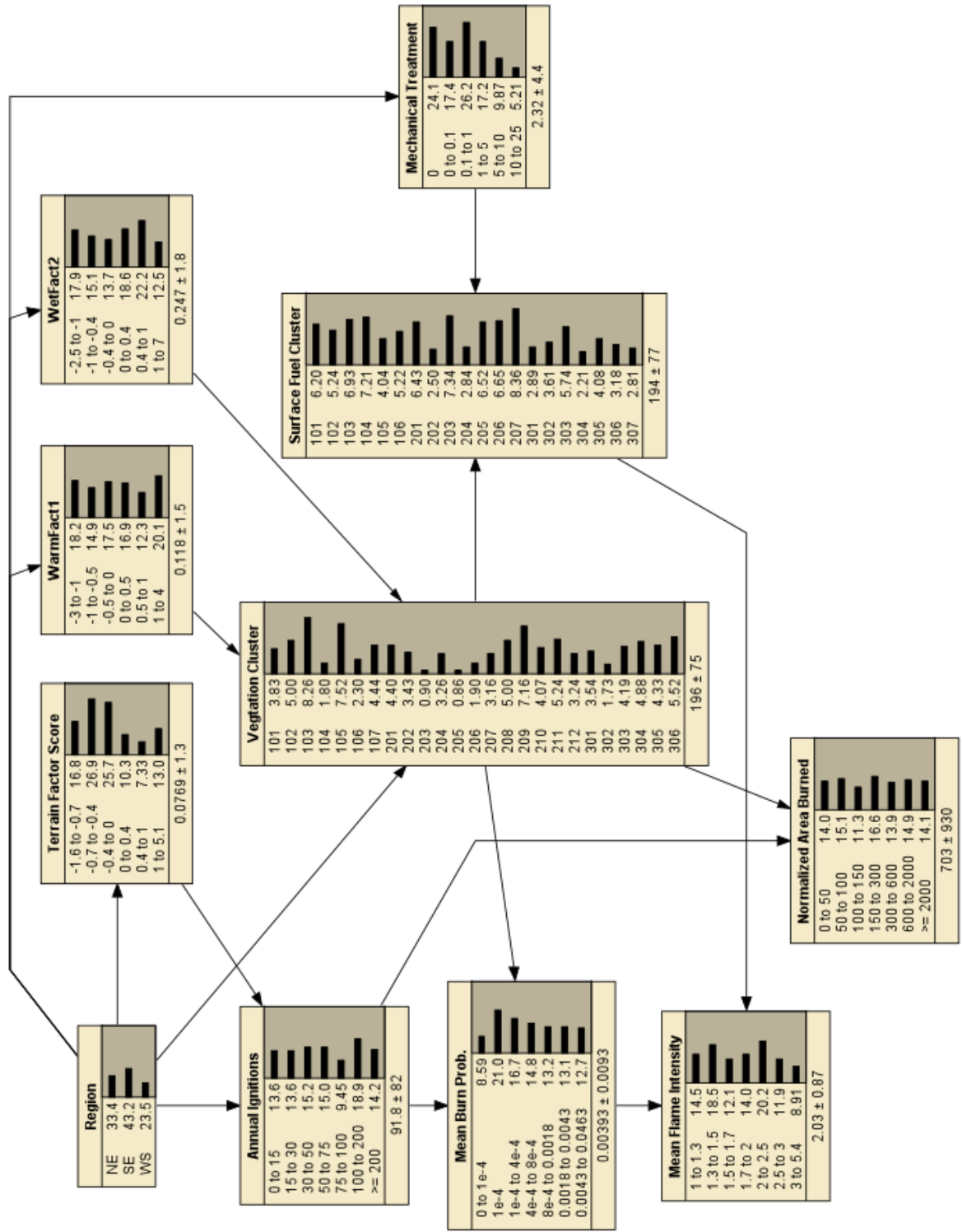


Figure 3. Simple Bayesian network illustrating the relationships among Cohesive Strategy *Region*, Annual Ignitions, and Normalized Area Burned, conditioned on *Region*. Probability histograms represent the percent of the counties within each region within each class.

Figure 4. Bayesian network illustrating relationships among variables reflecting the physical environment, vegetation and surface fuels, mechanical treatments in forested areas, wildfire ignitions, and various measures of wildfire extent and intensity.



## Appendix A. Variables available for use in the Phase III analyses.

Variable	Group	Description
COUNTY	A	County FIPS code
FIPS5	A	5-digit state and county combined FIPS code
STATE	A	State FIPS code
D_Mchn_pct	B	Landfire disturbance by mechanical treatment (%)
Dom_PAD	B	primary conservation partner
Log_All_Prds	B	index of forest product production
rdbuff_pct	B	percent of county withn 540 m of road
region	B	Cohesive Strategy region
SQMI	B	area of county in square miles
stateabv	B	state abbreviation
tot_dstb_pct	B	Landfire disturbance by all causes (%)
tot_pct_fed	B	federal ownership (% of area)
Tot_Pct_PAD	B	total conservation partner (% of area)
fmech_35	B	forested area available for mechanical treatment (% of county)
nfmech_35	B	non-forested area available for mechanical treatment (% of county)
Ecoregion	C	Bailey's ecoregion (modal value)
FuelClusR	C	Surface fuel cluster
FuelDist	C	deviation from cluster mean
ModeFRG	C	modal fire regime group
pct_forest	C	forested area (% of county)
TerrFact3	C	physical factor score weighted to terrain and summer precip.
VegClusR	C	existing vegetation cluster
VegDist	C	deviation from cluster mean
WarmFact1	C	physical environment factor score weighted to seasonal temperature
WetFact2	C	physical environment factor score weighted to seasonal precip.
Avg_vdep_NN	C	mean veg departure in natural areas
STD_vdep_NN	C	STD of veg departure in natural areas
Avg_vdep_Nm	C	mean veg departure in mixed natural areas
STD_vdep_Nm	C	STD of veg departure in mixed natural areas
APG90_10	D	annualized population growth 1990 - 2010
DemoFact1	D	demographic factor score (stress)
DemoFact2	D	demographic factor score (advantage)
EconType	D	dominant economic activity
HUWUI00	D	housing units within WUI 2000
MeanUrban	D	Mean urban value from Hargrove and Edwards map

<b>Variable</b>	<b>Group</b>	<b>Description</b>
Pct_Tmbr_Jbs	D	Forest industry jobs (% of employment)
Timber_Jobs	D	Number of forest industry jobs
Total_Popu	D	total population 2010
UrbanInf	D	Urban economic influence (ERS typology)
WUIFact1	D	WUI factor score (WUI area weighted)
WUIFact2	D	WUI factor score (weighted toward urban or % agriculture)
WUIFact3	D	WUI factor score (home density in interface and % of homes)
Pct_Nm	D	area in mixed-natural landcover (%)
Pct_NN	D	area in natural vegetation landcover (%)
FAC_index1	D	fire adapted community index (version 1)
FAC_index2	D	fire adapted community index (version 2)
Avg_HARM	E	mean HARM values from Anchorpoint product
b_fil_pct	E	area of county with burnable fuel types (%)
bp_b_MEAN	E	mean burn probability of burnable area
bp_b_STD	E	STD of burn probability of burnable area
D_fire_pct	E	Landfire disturbance by fire (%)
MeanFIL	E	mean fireline intensity level (FSIM modeled)
mode_HS	E	landcove type with most hotspots
NHrm_HPlus	E	area with high or greater HARM index (%)
norm_avg_brn	E	mean normalized area burned
norm_p95_brn	E	95th percentile of normalized area burned
nrmHS_A	E	hotspot density in agricultural areas
nrmHS_All	E	hotspot density in all areas
nrmHS_D	E	hotspot density in developedareas
nrmHS_Nm	E	hotspot density in mixed-naturalreas
nrmHS_NN	E	hotspot density in naturalareas
PrbFIL_4P	E	proportion of county with FIL = > 4
PrbFIL_5P	E	proportion of county with FIL = > 5
RX_ac_100sm	E	MTBS prescribed fire per unit area
RxF_pct	E	MTBS prescribed fire in forested area (% of Rx fire)
WF_ac_100sm	E	MTBS wildfire per unit area
for_rx	E	area available for prescribed fire in forested landscapes (%)
nfor_rx	E	area available for prescribed fire in non-forested landscapes (%)
RxSum	E	Hotspots attributed to prescribed fire
WfSum	E	Hotspots attributed to wildfire
log10_RxHS	E	Index of hotspot density (wildfire)



<b>Variable</b>	<b>Group</b>	<b>Description</b>
log10_WfHS	E	Index of hotspot density (Rx fire)
RxWf_HSratio	E	ratio of prescribed fire to wildfire
arv_ratio	F	index of variation in containment time (NFIRS)
cnt_ratio	F	index of variation in arrival time (NFIRS)
Combined_FPY	F	incidents per year, all sources combined
FED_FPY	F	federal incidents per year
FF_DEATH	F	fire-fighter injuries per 1000 incidents (NFIRS)
FF_INJ	F	fire-fighter deaths per 1000 incidents (NFIRS)
max_fsz_fed	F	max fire size, federal records
max_fsz_sf	F	max fire size, NASF records
med_arv_nfir	F	median arrival time, NFIRS (minutes)
med_cnt_nfir	F	median containmnet time, NFIRS (minutes)
med_dur_fed	F	median incident duration, federal (days)
med_dur_sf	F	median incident duration, NASF (minutes)
med_fsz_fed	F	median fire size, federal
med_fsz_nfir	F	median fire size, NFIRS
med_fsz_sf	F	median fire size, NASF
NASF_FPY	F	fires per year, NASF
NFIR_FPY	F	fires per year, NFIRS
p95_arv_nfir	F	95th percentile for arrival time, NFIRS
p95_cnt_nfir	F	95th percentile for containment time, NFIRS
p99_fsz_nfir	F	95th percentile for fire size, NFIRS
pct_int_HCF	F	intentional fires as percentage of human-caused ignitions
pct_nat_KNF	F	natural ignitions as percentage of all known causes
PctRep_FED	F	federal repsonse as percent of total reported incidents
PctRep_NASF	F	state repsonse as percent of total reported incidents
PctRep_NFIR	F	loacl (NFIRS) repsonse as percent of total reported incidents
pers_p_100sm	F	first responders per 100 square miles
stat_p_100sm	F	fire stations per 100 square miles
stat_p_10Kpop	F	fire stations per 10,000 people in county
SUP_PER	F	total suppression personnel in county
TOTALPERS	F	total response personnel in county
bldg_p_1K	F	mean buildings involved per 1000 incidents (NFIRS)
Natural_FPY	F	natural caused fires per year (total, extrapolated)
Human_FPY	F	human caused fires per year (total, extrapolated)
Arson_FPY	F	intentional human caused fires per year (total, extrapolated)

## Appendix 5 – Stakeholder Involvement

### a. Description of Stakeholder Engagements/Feedback

Representatives of the Western Region Strategy Committee attended local, regional, and national meetings and made presentations about the progress and current status of the Western Cohesive Strategy, as well as upcoming opportunities for comment and feedback. During those engagements, representatives made note of significant discussion topics, questions that “could not be answered”, and potential contacts who may have helpful “success stories” to share. Presenters reported the meeting information using “trip reports”. The trip report summaries are included below.

These engagements took place in the period from February 3, 2012 through August 3, 2012 and included 27 meetings in 9 western states as well as Washington, D.C. Over 935 people attended these meetings representing a broad array of interests and affiliations.

**Figure 1. Western Region Cohesive Strategy Engagement Record as of 8/3/2012**

Date	Event	Presenters	Location	Attendees
2/3/12	Madison County CWPP update (stakeholder meeting)	Terina Mullen	Ennis, MT	12
2/17/12	Anaconda-Deer Lodge Pre-disaster mitigation plan update (stakeholder meeting)	Terina Mullen	Anaconda, MT	23
2/17/12	Granite County Pre-disaster mitigation plan update (stakeholder meeting)	Terina Mullen	Phillipsburg, MT	20
3/5/12	National Incident Commander and Area Commander Meeting	Joe Stutler, Tom Harbour, Jim Hubbard, Roy Johnson	Denver	50
3/8/12	BIA National Fire and Forestry Management Meeting	Jim Erickson	San Diego	NR
3/13/12	PNWCG Monthly Meeting	Pam Ensley and Joe Stutler	Portland	30
3/20/12	Intermountain Region Fire Management Pre-Season FMO meeting.	Sue Stewart, Joe Freeland	Ogden, UT	40
3/22/12	BLM National Mitigation Education and Fuels Workshop	Joe Freeland, Brad Washa John Ruhs	Boise	30
3/27/12	IAFC/ Western Governors Assn.	Ann Walker	Reno	100
4/4/12	Great Basin Incident Management Team Meetings	Joe Stutler	Reno	150
4/10/12	BLMs Fire Leadership Team annual pre-fire season meeting.	Joe Freeland	Boise	30
4/11/12	California Nevada Hawaii Fire Council	Caitlyn Pollihan	Hawaii	NR

<b>Date</b>	<b>Event</b>	<b>Presenters</b>	<b>Location</b>	<b>Attendees</b>
4/16/12	Madison County CWPP update (stakeholder meeting)	Terina Mullen	Ennis, MT	6
4/18/12	NWCG Monthly Meeting	TBA	Boise	NR
4/25/12	WGA Staff Council	Ann Walker	Phoenix	30
5/1/12	USFS Region 2 Forest Supervisors Meeting	Dana Coelho	virtual	NR
5/8/12	Utah Interagency Fuels Workshop	Joe Freeland, Brad Washa, Erin Darboven	Salt Lake City	30
5/16/12	Western Forestry Leadership Coalition	Corbin Newman, Bob Harrington, Ann Walker, Sam Foster	Salt Lake City	50
5/17/12	National Indian Timber Symposium	Jim Erickson	Warm Springs, OR	NR
5/17/12	BLM Deputy State Directors, Resources & Minerals & WO Division Chiefs	Joe Freeland, Linda Booty	Washington D.C.	20
5/18/12	National Association of Counties - Western Interstate Region	Ann Walker, Bob Cope, Ryan Yates	Santa Fe, NM	35
5/22/12	BLM Field Committee meeting (associate State Directors & Deputy Assistant Directors)	Joe Freeland	Washington, D.C	20
5/24/12	USFS Region 6 Fire and Aviation Leadership Team Meeting	Joe Stutler	Portland, OR	100 +
6/7/12	Madison County CWPP update (stakeholder meeting)	Terina Mullen	Virginia City, MT	70
6/22/12	Western Regional Partnership Subcommittee on Disaster Response	Joe Freeland	Albuquerque, NM	30
7/11/12	Jackson and Josephine Counties Fire Board of Directors Meeting.	Joe Freeland	Medford, OR	10
7/17/12	"Revitalizing the National Forest System" Conference	Jim Golden, METI Inc.	Sacramento, CA	50
NR = No Report				

## Summary of Trip Reports through 8/3/2012

Number of Meetings/Events (reported) 267

Meeting or Event Name (see list above)

Number of Attendees 935+

Locations by State Arizona, California (2), Colorado, Idaho (3), Montana (5), Nevada (2), New Mexico(2), Oregon (4), Utah (3), Washington D.C. (2)

Stakeholder/Affiliations Represented

- Firefighters
- Collaborative Landscape Treatment Groups
- Regional, State, Local Land Managers
- Insurance Industry
- Firewise Communities
- County Commissioners
- Federal Government
- Tribal Government

## Unique Discussion Points (beyond the general CS Briefing)

- Using the Deschutes Collaborative Forest Restoration Project to explore the immediate successes of the Cohesive Strategy as an example from Oregon
- What is the crosswalk between the Cohesive Strategy and the new Planning Rule?
- How will things be different in 5 years because of the Cohesive Strategy?
- Concerns were expressed related to the value and meaning of the effort. Comments along these lines related to concerns that this effort has not been clearly outlined and that the expectations for success are still not clear.
- There was a concern expressed that the Western Region is too large to represent only one common strategy.
- There was concern that some of the actions are daunting and could be a very big workload.
- With concepts on local stakeholders and other plans, could there be a collision down the road?
- Still continuing to do CWPPs, etc.; can we take a step further when prioritizing projects on private ground? An "active" community should be one of the priorities – not color schemes on the map.
- Questions ranged from: Do we anticipate significant organizational changes to result from these efforts as well as the current budget climate?
- Why are we not consolidating capability in an interagency manner when it makes sense?
- There were several questions related to expected outcomes, the answers were consistent with reducing our risk trajectory in all three goals by using and leveraging all levels of government and stakeholders in a more effective way than ever before.
- What's the worst thing that can happen to "us" if this fails, or how do you think the products or implementation actions will be used in the future?" There was some concern that the FS was not strongly represented on the technical or strategic groups during the NSAT interaction, certainly no one stepped up to volunteer, comfortable with information now.
- Several questions and some discussion on how some of the actions in the Western Region are consistent with fire management consolidation and leveraging of capability within the Forest Service Intermountain Region.
- There was discussion relating to how this effort builds on and evolves previous strategic efforts such as FPA, the National Fire Plan etc...
- There were concerns expressed that this was a top down effort e.g. The Flame Act, but we were able to illustrate how the all hands, all lands approach was being use and in fact the assessments in Phase II and again in Phase III were shaped by comments from all stakeholder that came from the ground and not from the beltway.



- On two occasions, with direct conversations with State Foresters and Regional Foresters, we talked through real life situations each were having in their respective states and gave several example of how the goals of the CS would work for them to resolve issues that directly relate to CS implementation.
- One Regional Forester asked specifically, "if you were me, what you do to help facilitate the CS efforts?" Response was look for those immediate opportunities in your region and personally recognize those efforts particularly when the successes involved multiple stakeholders including the FS.
- The importance of promoting inclusive CWPP efforts to build capacity and to achieve the goals of the CWPP, as well as the CS. Copies of the Community Guide to Preparing and Implementing a CWPP were given to each participant along with a WFLC CS Support document.
- Two participants inquired about how the CS would help them? They live in an area with high conflict between the federal agency and the county and with environmental groups not participating in the collaborative group. The county wants to retain access rights to public lands and the USFS is suing the county. The fact remains there will be litigation and groups that choose to litigate instead of participating in the local collaborative. There are examples of collaborative group members banding together to testify in court, against environmental groups, in support of the projects identified by their collaborative group/CWPP.
- Interest in how science would be included in the phase III process.
- Concepts related to how the strategy relates to collaborative efforts in the southern Oregon.
- What will we in the field see that is different? We hope to see allocation processes local, state, and federal that recognize and reward active vegetation management, broad collaboration, and shared responsibilities.
- Does this have the likelihood for more fuels money, more prevention people, or more firefighting resources? In some areas those things may be the result, but in some cases there will be re-prioritization and subsequent reductions based on limited public sector investment capability.
- How can it be budget neutral? Local, State, and National public sector funds are flat or declining. It appears that that trend will persist for some time. Market based solutions, proponent supported off-site mitigation, and non-public sector investments need to be nurtured and leveraged.
- What are the incentives and dis-incentives for forests to get on board? There has been extensive non-federal participation in to all three phases thus far. Much of the federal wildland fire management force continues to be skeptical or unaware of the effort. If that sector of the stakeholder group does not participate, then they may not like the outcome.
- How the strategy relates to other collaborative efforts in the Southwest. There were several questions as to who might be participating in the Southwest.

### Questions That Could Not Be Answered

- When will we have conversations about shifting the budgets?

### Leads for Immediate Actions/Success Stories

- Deschutes Collaborative Forest Restoration Project - Katie Lighthall
- Quincy Library Group - Frank Stewart
- All 23 CFLRP projects funded in 2010 and 2012
- Paul Summerfelt from Flagstaff Fire Department has taken the 3 goals of CS and applied to his department and area, separate attachment coming.
- Mike Morcom, State FMO for BLM Idaho will use the update of the Master mutual aid agreement and identify existing barriers for implementation, particularly for local government and volunteer fire departments.
- Pam Ensley has some specific PNW lessons learned success stories she wants to post on the Western Portal that can be used for our outreach efforts.

- Sue and Craig Glazier will begin exploration of an Island Park, Idaho collaboration effort with a current, interested county commissioner that is very excited about this topic and has connection bridges between the agencies and the community.
- The PNW will identify a person from Fire and Aviation who will be a specific contact for SORO (State Office/Regional) office and suggest we need to contact regional fire directors and State FMO's looking for similar points of contact
- Policy will be adopted by the governors during their annual meeting on June 11th and posted to the web at [www.westgov.org](http://www.westgov.org). The final policy will be shared with the WFLC, WFEC, WRSC, and others.
- Presentation by Doyel Shamley, Natural Resources Coordinator for Apache County, AZ, Illustrated an aggressive approach to treating the WUI around the community of Greer AZ, utilizing local community resources. The community asserted a "right" to treat the surrounding federal forest in the name of public safety, and, in a sense, "brought" the USFS along.
- Efforts on the border area regarding state of the art efforts in emergency response communications interoperability.(From Western Regional Partnership)

## Appendix 6 – Communications Activities (Communications Team)

### Summary of Efforts in Phase III

The Western Region identified the need early in Phase III for a working group focused on communications, outreach, and improving our connectivity to our diverse group of stakeholders. To that end we solicited participation of a variety of stakeholders with a passion for the efforts related to the three goals. The Region, with the support of the WFLC focused a degree of energy on continuing to identify and share success stories that illustrate cohesive strategy behavior and actions. We also spent some energy on the collaboration part of the equation, especially as it relates to communities and what elements lead to successful outcomes. We also spent some energy on expanding the scope and effectiveness of the Community Wildfire Protection Planning (CWPP) process. Through these efforts we were able to gain a common understanding of community capacity, how we might use the success from one area to translate in to potential solutions for other areas, and how we might improve the effectiveness of CWPPs and related efforts. Below, you will find a summary from those three efforts as well as some recommendations for moving forward on the specific topic or for the West in general. To see the complete versions of each of these efforts please refer to the following link and look at the reports section. <http://sites.nemac.org/westcohesivefire/>

### Living with Wildfire: The State of Practice in Western Communities

#### Executive Summary

In order to integrate the experience and insights of community stakeholders working on fire management issues in the west, leaders responsible for the Western Region Cohesive Strategy needed a strong understanding of current trends, needs and opportunities. This assessment was designed to provide that information and is intended to inform strategies, policies and programs emerging through the Cohesive Strategy and in subsequent national fire management investments and priorities going forward. We framed the assessment around the three goals set out in the Cohesive Strategy: response to wildfire, fire adapted communities, and resilient landscapes. The following findings represent a synthesis of the information offered by over 500 individuals reflecting on their experience with fire management:

- A majority of respondents were working across multiple fire management goals in their communities, indicating opportunity for realizing integration and synergy among the three Cohesive Strategy goals.
- Collaboration, cooperation and shared-leadership were highly utilized and highly valued.
- Increased collaboration, communication and sharing of responsibility and authority at the local level can yield improved and sustained partnerships, and improve fire management outcomes.
- Community stakeholder capacity and engagement, supported by flexible programs and partnership arrangements, are important to successfully accomplishing the three Cohesive Strategy goals.

- In both the provision of technical information and assistance, and in learning about new developments in support of fire management, respondents strongly favored various forms of in-person and interactive communications (peer networks, personal contacts, workshops, field tours, etc.) as the most effective tools. However, they also drew on the full array of tools and resources available.
- A diversity of leaders and stakeholders are working through partnerships to plan and implement effective and innovative fire management strategies. However, their successes are constrained by a wide range of social, policy and physical challenges that will require strategic and concentrated actions and investments at multiple levels to overcome.

We hope these findings will guide the Western Region Cohesive Strategy in addressing challenges and supporting at-risk communities as they work to better live with wildfire.

### *Recommendations*

- Focus on fostering integration among the three Cohesive Strategy goals
- Continue investing in collaboration, cooperation and shared-leadership at the local level
- Increase investment in stakeholder capacity and engagement, supported by flexible programs and partnership arrangements, at the local level
- Increase investments in the various forms of in-person and interactive communications (peer networks, personal contacts, workshops, field tours, etc.)
- Continue investing in the full array of outreach and communications tools and resources currently available.

## **Cohesive Strategy Success Story Framework**

### *Executive Summary*

Stakeholder comments provided during Cohesive Strategy (CS) development emphasized the need to streamline the transfer of technology and knowledge from those experiencing success, to those seeking it. Success Stories can serve as one way of building and strengthening the important cultural connection needed between the diverse fire-adapted landscapes and stakeholders who inhabit the West.

Collectively success stories are seen as:

1. A tool to provide examples or illustrations how to move toward or achieve the goals, objectives, and actions associated with the CS and
2. Demonstrations of immediate actions that could be taken by stakeholders to adapt and live with fire in their communities consistent with the goals, objectives and actions described within the Western Region Strategy and Assessment.

Stakeholder engagement and involvement has been a cornerstone of the CS development effort. Building on and strengthening stakeholder engagement and expanding stakeholder networks provides a foundation for leveraging increasingly scarce resources needed for implementation. Stakeholder networks must be expanded and strengthened. However, an improved delivery method or framework for developing, organizing, and sharing success stories is needed.

The Success Story Framework directly addresses these needs and is designed to:

#### **A. Align and Distribute Success Stories Consistent with CS Objectives and Actions**

Making a link between Success Stories and the goals, objectives and actions developed for the Western Region is a key step in implementation. Simply collecting Success Stories from across the West and making them available to stakeholders using web-based search engines, etc. does not accomplish this alignment. It is important to use Success Stories as illustrations of the outcomes envisioned during the collaborative development process and to anchor them to the objectives and actions described in the CS.

This alignment will also address needs communicated by stakeholders to provide concrete examples of how their peers are making progress toward or achieving outcomes described in the CS. Peer-to-peer networks have been identified as one of the most effective methods of providing the transfer of knowledge and experience.

## **B. Identify Success Stories for the Full Range of CS Objectives and Actions**

A preliminary analysis of existing Success Stories posted on Forest and Rangelands.gov, wildlandfireprograms.usda.gov, and others developed during Phase III has identified a “gap” in examples associated with the full range of objectives and actions described in the CS and the diversity of situations faced by stakeholders in different “operating environments”.

## **C. Provide Stakeholders Relevant and Meaningful Examples of Success Stories Corresponding to their Operational Situation**

The Western Region is recognized as ecologically and culturally diverse. The Framework is designed to provide stakeholders a resource to search for Success Stories about objectives and actions accomplished using different collaborative schemes in socio-economic settings similar to their operating environment.

## **D. Provide a basis for monitoring implementation of the CS**

Success Stories can provide empirical evidence over time for monitoring progress in implementing the CS's guiding principles and collaborative efforts. An evaluation or “snapshot” of the approaches described can provide the basis for monitoring the change in community problem solving methods being employed and the range of CS objectives and actions being addressed.

Delivery of accurate and integrated information to stakeholders consistent with the principles and goals of the CS must be sustained during implementation. Success Stories provide illustrations and examples of stakeholders working toward the goals and objectives of CS and will provide a durable and expanding stakeholder resource during implementation. An improved web-based delivery mechanism and system for generating Success Stores that incorporates the features of the Success Story Framework is needed to meet these demands.

### ***Recommendations:***

Delivery of accurate and integrated information to stakeholders consistent with the principles and goals of the CS must be sustained during implementation. Success Stories provide illustrations and examples of stakeholders working toward the goals and objectives of CS and will provide a durable and expanding stakeholder resource during implementation. An improved web-based delivery mechanism and system for generating Success Stores that incorporates the features of the Success Story Framework is needed to meet these demands.

## **CWPP to Protect Landscapes & Communities: CWPPs and the Middle Ground**

### ***Executive Summary***

Community Wildfire Protection Plans (CWPPs) are planning documents in which communities and counties in the Wildland Urban Interface (WUI) strategize to reduce the threat and potential impact of wildland fire. During the Cohesive Wildland Fire Management Strategy stakeholder input process, many WUI residents made it clear that they value many aspects of the landscape as much as they do their homes. They spoke movingly of the need to protect watersheds, wildlife habitat, cultural use areas and sites, utility corridors, evacuation routes, forested views, and other high value areas and assets. Tribal representatives talked about the need to consider the home and the homeland in unison, and not as two separate entities. The Western Regional Strategy Committee (WRSC) identified the “middle lands” or “middle ground,” areas between the WUI and the backcountry, as an area of concern for fuels treatments, to protect both landscapes and communities. Concern about protecting communities and community values can extend well beyond the community's boundaries.

This study looks at how the middle ground is being addressed in existing CWPPs, and at the guidance with which CWPP planning groups are working. Setting the WUI boundary is one of the steps in doing a CWPP. The WUI is located near communities at risk. It's important to consider the relationship of the WUI to the community at risk when determining the WUI boundary. This study examined the CWPP guidance and many CWPPs to determine if CWPPs, as they are currently being done, address the middle



ground adequately. This paper discusses the results of the study, and shows a few examples of CWPPs, and how they protect values-at-risk beyond the WUI boundary. The examples also show methods of prioritization of actions for implementation.

A review of many Western CWPPs shows that there are different definitions in use for at-risk communities and the WUI boundary. The definitions of at-risk communities and the WUI have changed in practice since they were first defined in the Healthy Forest Restoration Act (HFRA) and in the Federal Register. The differences center around whether a community at risk must be near federal land, and if there is a set distance for the WUI boundary. Where there is no CWPP, HFRA sets a maximum distance around the community for the WUI. However, where there is a CWPP, the WUI boundary is defined by the collaborative group, which creates the CWPP. Proximity to federal land is not a requirement if the community is located in an environment that is deemed a high wildfire risk area. The CWPP process gives members of communities and counties with CWPPs the opportunity to provide input into the prioritization process for fuels treatments on public land. The ability to define the WUI boundary in accordance with the unique circumstances of their community and to provide input in the prioritization process are two of the best reasons for communities or counties to create CWPPs.

Across the West, most states did CWPPs at the county level, or at the county level with additional specialized CWPPs focusing on smaller regions within the county. The approaches to defining the WUI and prioritizing projects are varied in CWPPs, with many creative and valid methods employed. The study found that CWPPs done at the county level frequently address the middle ground and consider fuels treatments in the middle ground as part of the prioritization process.

The study finds that there is nothing in the definitions or guidance relating to CWPPs that prevents communities or counties from designating WUI boundaries where they see fit. However, some groups doing CWPPs are not aware of the flexibility of the definition. States, counties and municipalities should educate CWPP groups about the benefits of setting their own CWPP boundary.

As the examples contained in this study show, there are many ways in which CWPPs have successfully incorporated middle ground planning. CWPPs done at the county level often treat the entire county as the area of concern, and may not identify a WUI boundary at all. An example of this method is the Trinity County, California CWPP. Other CWPPs identify a WUI boundary, but plan beyond it by designating areas of concern or areas of special interest (ASIs) such as in the Montrose, Colorado CWPP. Other techniques include identifying a WUI Zone-2, which has prescriptions for fuel treatments that are less stringent than in the more urbanized WUI Zone-1, as in the Mill Creek Canyon, California CWPP. And some CWPPs identify the WUI in relationship to other factors of community importance, not just proximity to structures, as in the Mill Creek Watershed, Oregon/Washington CWPP and the Orleans/Somes Bar, California CWPP.

To best address the middle ground, it is advisable to do a tiered approach to CWPP development, with local, tribal, state and federal entities sharing information on values at risk, whenever possible. Adjoining states, tribes and communities can work together, sharing information across boundaries. In this way, ecological regions, which span multiple counties can have almost seamless CWPP planning. Or, as is done in the Mill Creek Watershed, Oregon CWPP, the entire area of concern can be defined within the WUI boundary. In that case, a valuable watershed, which provides drinking water to the nearby city and covers parts of four counties in two states (Oregon and Washington), is all within the WUI boundary. Additionally, the Orleans/Somes Bar CWPP spans three counties to include landscapes of community importance, even though each county CWPP breaks the planning area up along county lines. To address the need for planning centered around communities at risk, implementation of the CWPP is coordinated with Tribal planning efforts, and is tiered to tribal and county CWPPs and equivalents. By using a more open definition of WUI, we are taking a holistic approach to the location of communities within the landscape and the interdependence of the community and its surrounding landscape.

### **Recommendations from this study include:**

1. CWPPs or equivalents should be scaled to the county, tribal territory, and/or area of community importance to include middle ground areas as delineated by how communities identify themselves with the landscape concerned.
2. Targeted community CWPPs can be done to supplement the county and/or tribal CWPP or equivalent(s).
3. Adjacent counties, states, tribes, and municipalities should share information and coordinate plans across boundaries for a seamless approach to wildfire planning.
4. Doing small projects first builds community involvement and capacity for larger projects.
5. Weighting systems for hazardous fuels treatments should be sensitive to the differences between the types of places, such as urban, suburban, rural, watershed, evacuation route, etc.
6. In the prioritization analysis, extra weight should be given to fuels treatments in close proximity to communities, to provide protection to both the community and the landscape, and these fuels treatments should be done regularly to keep fuel loads low.

States, counties, tribes and municipalities should give guidance to CWPP planners about the importance of setting the WUI boundaries in coordination with tiered documents to address areas of concern and ecological values at risk.

### **Information and Resources for Communities, Agencies, and Other Stakeholders**

There is a great deal of material (how-to guides, training manuals, collections of success stories, etc.) available to help communities, federal and state agencies, and other stakeholders better understand how to initiate and/or become effectively engaged in collaborative processes.

The Forest Service's Partnership Office website <http://www.fs.usda.gov/main/prc/tools-techniques/collaboration> begins with "The Art of Collaboration" and follows it with sections on partnership development, finding funding for collaborative efforts, and monitoring and joint learning. It also includes a series of training modules on partnerships and collaboration

There is also a great deal of helpful information on the Forest Service's restoration website. Much of it was developed in response to the authorization of stewardship end result contracting (SERC), and that has been augmented with lessons learned from the more recently initiated Collaborative Forest Landscape Restoration Program (CFLRP). The Forest Service's SERC information (including training materials and success stories) can be found at

[http://www.fs.fed.us/restoration/Stewardship\\_Contracting/training.shtml](http://www.fs.fed.us/restoration/Stewardship_Contracting/training.shtml)

The CFLRP information begins at

<http://www.fs.fed.us/restoration/CFLRP/index.shtml/index.shtml>.

The "Results" tab leads to reports on individual projects and success stories, and the "Training" section to recorded peer learning sessions, some of which focus on collaboration.

The Pinchot Institute for Conservation has been conducting yearly programmatic monitoring of SERC projects for the Forest Service (since 1999) and the BLM (since 2005). The resulting annual reports are available at

[http://www.pinchot.org/gp/Stewardship\\_Contracting](http://www.pinchot.org/gp/Stewardship_Contracting)

One of the major issues which has been tracked over time is how Forest Service and BLM personnel can increase and improve agency engagement in local collaborative processes. The results are usually worth the effort, but the up-front investment of time that has to be made can be substantial. The regional monitoring teams assessing the information gathered each year have consistently said that

1. collaboration needs to be part of the job – not an add-on to it – and
2. there needs to be appropriate recognition of good work in collaboration – positive performance evaluations, etc.

The Council on Environmental Quality has an excellent handbook on collaboration in the NEPA process that explains how agency personnel can be productively involved in collaborative efforts without

running afoul of the Federal Advisory Committee Act (FACA). That document can be downloaded from [http://ceq.hss.doe.gov/nepa/nepapubs/Collaboration\\_in\\_NEPA\\_Oct2007.pdf](http://ceq.hss.doe.gov/nepa/nepapubs/Collaboration_in_NEPA_Oct2007.pdf).

The Bureau of Land Management's recently issued National Natural Resources Policy for Collaborative Stakeholder Engagement and Appropriate Dispute Resolution focuses on preventing, managing, and resolving conflicts or disputes through collaborative stakeholder involvement. It's at [http://www.blm.gov/pgdata/etc/medialib/blm/wo/Planning\\_and\\_Renewable\\_Resources/adr\\_conflict\\_prevention.Par.44228.File.dat/ADR.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/wo/Planning_and_Renewable_Resources/adr_conflict_prevention.Par.44228.File.dat/ADR.pdf)

The BLM's ADR program website provides a list of available training programs as well as an extensive bibliography "for those interested in learning more about Alternative Dispute Resolution, collaborative engagement, public participation, and related disciplines" at [http://www.blm.gov/wo/st/en/prog/more/adr/training\\_and\\_resources.html](http://www.blm.gov/wo/st/en/prog/more/adr/training_and_resources.html)

The National Forest Foundation's Collaboration Resources website (<http://www.nationalforests.org/consERVE/resource>) has a "Learning Topics and Tools" section that provides "examples, best practices, and other resources for practitioners working in the field of conservation and collaboration". NFF also offers technical assistance and some grant assistance for qualifying organizations.

The Red Lodge Clearinghouse's Collaboration Handbook (<http://rlch.org/content/collaboration-handbook>) provides a step-by-step "how-to" guide for collaborative groups, with chapters on:

- when to collaborate,
- getting started,
- the first meeting,
- subsequent meetings,
- strategic planning,
- gathering resources,
- organization structure,
- dealing with problems, and
- the maturing collaborative.

While not focused on long-term collaborative efforts, the BLM's *Earning Bridges: Strategies for Effective Community Relations Before, During, and After the Fire*, provides practical, common-sense guidance "about building and maintaining relationships" – the core of any collaborative process. As to why that matters, *Earning Bridges* says:

*There are pockets of the West where BLM fire programs have developed and maintain positive, productive relationships with special publics, particularly the ranching community. These relationships have multiple benefits that lead to cooperation and a safer environment when fires occur. Where these relationships do not exist, a lack of understanding, communication, and coordination results in unnecessary obstacles and challenges, and safety issues that threaten both firefighters and the public.*

The handbook is available at [http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information\\_Resources\\_Management/policy/ib\\_attachments/2007.Par.23468.File.dat/ib2007-075attach1.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/ib_attachments/2007.Par.23468.File.dat/ib2007-075attach1.pdf)

## Conclusions and Next Steps for Communications

These efforts show the need for continued communication efforts among stakeholders on all topics related to the Strategy. We need to exchange information on successes through a variety of methods and approaches. We have learned that communities and collaborative processes are the cornerstone to success in all three goal areas. Continued efforts to create a broad, common understanding and support among all stakeholders for the underlying principles of the Strategy need to be prioritized. We also have learned that the hub and spoke peer networks between agencies, collaborative efforts, various Non-government organizations, and academia are working very well and those networks will be key in the success of the three goals. We do have four specific recommendations that can be added to the sets above:

1. We recommend the upgrade or design of an improved delivery platform as a vehicle for Cohesive Strategy tools such as success stories. This can be done by modifying existing sites such as [forestsandrangelands.gov](http://forestsandrangelands.gov) or choose an existing site that is already configured for continuous updating and modification.
2. We recommend the establishment of a monitoring function to evaluate our success in our efforts related to stakeholder engagement and success towards the three goals.
3. We recommend continued regional outreach and engagement to increase participation and shared understanding of Cohesive Strategy principles.
4. We need to continue to develop collaboration tools, increase communications networks, and strengthen the common adoption and understanding of Cohesive Strategy principles.

### **Monthly Updates**

Ongoing communication activities include monthly updates, a brief newsletter format which provides highlights of:

- National Science and Analysis Team Activities,
- Progress and process items from the Western Regional CS effort,
- Items from current events from outside, but relevant to the Cohesive Strategy process,
- And links to the latest “Success Stories” developed by the team.

The update also includes links available for additional information about the CS, as well as to the co-chairs of the WRSC.

“Success Stories” are one of the more effective means of assisting stakeholders in their pursuit of information about techniques and challenges that will facilitate their movement toward achieving the goals of the Cohesive Strategy. Actual situations and events from around the Western US are compiled and made available at the WRCS website, and local contacts are often included for additional help and information.

Monthly Updates and “Success Stories” are posted to the WRSC website beginning in July of 2011 and continuing to the present. These are available at <http://sites.nemac.org/westcohesivefire/updates/> or <http://www.forestsandrangelands.gov/strategy/index.shtml>

### **Presentation Materials**

The WRSC members and representatives also maintained a variety of presentation tools and materials, including briefing papers and Power Point Slide Presentations, some of which can be found on the following pages.



## Cohesive Strategy Briefing Paper

The National Cohesive Wildland Fire Strategy was requested by Congress to address the wildfire problems facing communities, such as: loss of life and property, suppression costs, damage to natural and cultural resources, and coordination between fire jurisdictions. The Western Strategy is one of three regional strategy efforts being developed with the participation and assistance of a wide variety of stakeholders and interests across the country.

### The three principal goals of the National Cohesive Strategy are:

- Restore and Maintain Resilient Landscapes: reduce the risk to forests and rangelands.
- Create Fire-Adapted Communities: withstanding a wildfire without loss of life, property, and community assets.
- Respond to Wildfires: All jurisdictions participate in safe, effective, efficient wildfire management through improved intergovernmental coordination.

### The Western Regional Cohesive Strategy group has:

- adopted those three goals
- contributed ideas to shape the future of wildfire management
- produced the “Western Regional Assessment and Strategy”

### In the next phase, the Group will develop:

- a regional wildfire risk assessment
- an evaluation of options and alternative scenarios for the Western Strategy
- performance measures to assure the strategy is effective
- guidance on implementing the strategy

### The outcomes from the Western Regional Cohesive Strategy are:

- Improved efficiency for all state, federal, tribal, and local firefighting organizations.
- Forests and rangelands that will better withstand wildfire.
- Communities with reduced risk of loss of life and property when wildfire occurs.
- Communities and agencies positioned to work collaboratively on wildfire management issues.

The three regional strategies will be integrated to produce a National Cohesive Strategy that reflects the unique cultures and environments of the West, the Northeast, and the South. Remain engaged by following the latest information at [www.forestsandrangelands.gov/strategy/](http://www.forestsandrangelands.gov/strategy/).

# Western Region Cohesive Strategy Overview June 2012



## Cohesive Strategy Briefing

The National Cohesive Wildland Fire Strategy was requested by Congress to address the wildfire problems facing communities, such as:



- Loss of life and property
- Suppression costs
- Damage to natural/cultural resources
- Coordination between jurisdictions.

## National Cohesive Strategy

### Goals

1. Resilient Landscapes
2. Fire-Adapted Communities
3. Wildfire Response



## Restore/Maintain Resilient Landscapes

Reduce risk to forests and rangelands





## Create Fire-Adapted Communities

Withstanding a wildfire without:  
Loss of life - Property - Community assets



## Wildfire Response

All jurisdictions participate in safe, effective, efficient wildfire management through improved intergovernmental coordination

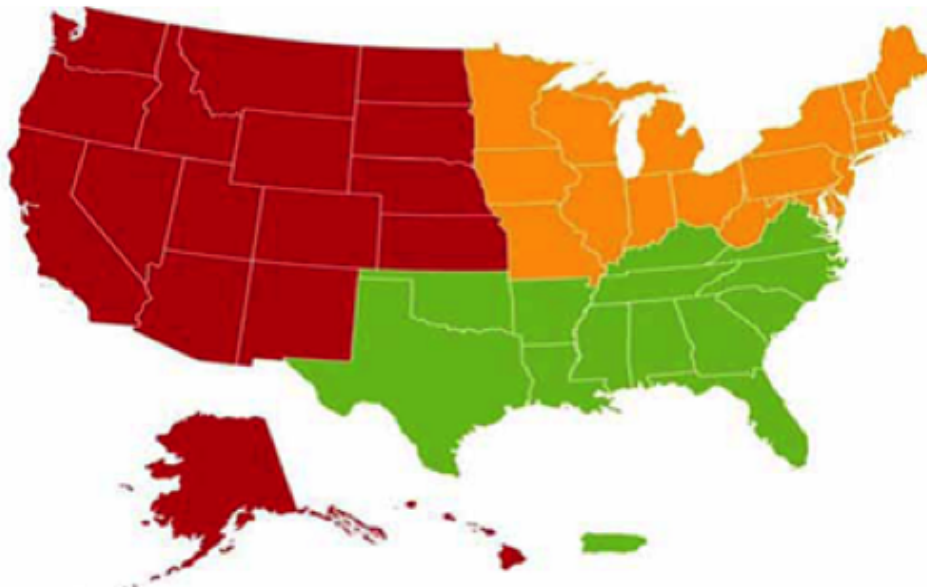




## Regional Cohesive Strategies

Regions: North, South, West

Stakeholder participation around the country



### Western Regional Cohesive Strategy Group

- Adopted and developed the 3 national goals
- Contributed ideas to shape the future of wildfire management
- Western Regional Assessment and Strategy



## Western Regional Cohesive Strategy



### NEXT PHASE

- Regional wildfire risk assessment
- Evaluation of options and alternative scenarios
- Performance measures
- Guidance on implementation

## Western Regional Cohesive Strategy

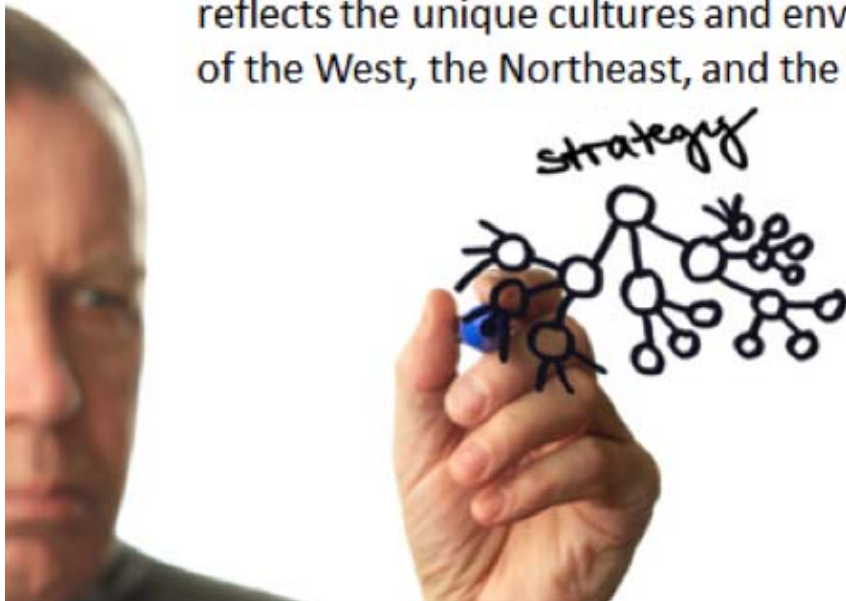
### Results:

- **Improved efficiency**  
... federal, state, tribal, local
- **Better withstand wildfire**  
... for forests and rangelands
- **Reduced risk to communities**  
... loss of life/property
- **Positioned to collaborate**  
... with Communities/agencies



## National Cohesive Wildland Fire Strategy

The three regional strategies will be integrated to produce a **National Cohesive Strategy** that reflects the unique cultures and environments of the West, the Northeast, and the South



[www.forestsandrangelands.gov/strategy/](http://www.forestsandrangelands.gov/strategy/)



## Appendix 6 - Communications Plans and Actions - Regional Webpage Information and Content

The Western Regional Strategy Committee maintains a webpage at <http://sites.nemac.org/westcohesivefire> to provide stakeholders with current and useful information and to serve as an outreach site to collect comments about the CS effort at the appropriate times.


The “Welcome Page” provides a brief introduction to the CS effort and describes the three CS regions.

The “About You” page serves as the site where “Success Stories” are found. There are also links to other resources which may be useful to communities and groups of stakeholders who are seeking information about the techniques, processes, tools and challenges of working together to achieve the three goals of the Cohesive Strategy.

The “Reports” page provides stakeholders with the links to the monthly updates as well as links to the Western Regional Strategy and Assessment, Content Analysis from two outreach efforts, and a link to the National Cohesive Strategy home page.

Those web pages are shown on the following pages for illustration. They are available at <http://sites.nemac.org/westcohesivefire>.

### Western Region



The screenshot shows the header of the Western Region webpage. It features a green banner with the text "Cohesive Wildland Fire Management Strategy" and "National Goals; Collective Solutions". To the right of the banner, there are four lines of text: "Response to Wildfire", "Fire Adapted Communities", "Resilient Landscapes", and "Supported by Science". Below the banner is a navigation menu with links for "Welcome", "About Us", "About You", "Reports", and "Contact Us".

#### Welcome

Interested in the Cohesive Strategy? Here's a quick background:


#### The FLAME Act

Faced with increasing numbers of catastrophic, emergency wildland fires, the U.S. enacted the Federal Land Assistance, Management and Enhancement Act (FLAME) Act in 2008 to establish a new federal fund to cover the growing costs associated with fighting these fires.

#### Western Region

The FLAME Act also required a cohesive wildland fire management strategy. To achieve this, the U.S. was divided into three zones: west, southeast and northeast. Representatives from agencies, governments and other stakeholders in the 16 western states are working towards a cohesive strategy that will enable them to plan for and respond to wildland fires efficiently and strategically by restoring and maintaining resilient landscapes, creating fire adapted communities and encouraging jurisdictional collaboration.

Similar efforts have been underway for the last decade; however, the Secretaries of Interior and Agriculture directed this to be the most all-inclusive effort ever attempted to develop a national wildfire management cohesive strategy.



The map shows the United States divided into three regions: the West Region (red), the Northeast Region (orange), and the Southeast Region (green). Alaska and Hawaii are also shown in red.



## Western Region



**Cohesive Wildland Fire Management Strategy**  
National Goals; Collective Solutions

*Response to Wildfire*  
*Fire Adapted Communities*  
*Resilient Landscapes*  
*Supported by Science*

[Welcome](#) [About Us](#) [About You](#) [Reports](#) [Contact Us](#)

### About You

#### Stakeholder Collaboration

This is an all inclusive, wildland fire management stakeholder effort – a long-term, iterative process with ongoing dialogue. We are seeking the most diverse opinion-base possible to help develop the National Wildland Fire Management Cohesive Strategy (Strategy) within the time limitations agreed to by Congress and the Administration.

- The Strategy is to establish national direction for wildland fire management, representing the needs and capabilities of all cooperators, including the public.
- The Strategy is about more than fire suppression. It emphasizes restoring resilient landscapes and promoting fire adapted communities.
- The Strategy is designed to better align national level decision-making with the broad diversity of regional and local interests.

Find Success Stories in our  
About You section

Search our site

Search

## Success Stories from Western Stakeholders

Success Stories are examples of communities, tribes, agencies, organizations, and individuals making progress toward achieving the vision defined by the Cohesive Strategy “...to safely and effectively extinguish fire, when needed; use fire where allowable; and as a nation, to live with wildland fire.” Progress is made toward one or more of Cohesive Strategy’s three goals consistent with the Guiding Principles adopted during Phase I. Click on those stories below that interest you -

- [Structure Protection at Elk Stream Ranch](#) - The First 48 Hours of the Weber Fire and how a small community in western Colorado managed to protect their homes from wildfire.
- [Northern California Prescribed Fire Council](#) - While there are many impediments to the use of prescribed burning, an organization with a participatory professional culture can pave the way for reviving fire use in land.
- [Spring Mountains National Recreation Area Hazardous Fuels Reduction Projects](#) -Less than an hour’s drive west of Las Vegas, Nevada (population 583,756), the Spring Mountains rise high above the desert that completely surrounds them, reaching nearly 12,000 feet at the summit of Mount Charleston.
- [Selway-Bitterroot Wilderness Fire Program](#) - Restoring wildland fire to restore fire-adapted ecosystems and reduce longterm management costs.
- [Karuk Tribe – Bringing Fire to the People](#) – Using traditional ecological knowledge to manage resilient ecosystems, create fire-adapted communities, and respond to wildfire.
- [Upper Deschutes River Coalition](#) – Mission: “To protect Upper Deschutes River Communities by restoring and sustaining healthy fire-resistant forests, pure and abundant river flows and wildlife habitat.”
- [Whitefish Area Fire Safe Council](#) – Working together to educate and facilitate the Whitefish Community to reduce wildfire risks and to maintain a Fire Safe environment.
- [Flagstaff Fire Department](#) – Establishing performance metrics to measure progress toward collaborative objectives set for each of the three Cohesive Strategy Goals.
- [Colorado Bark Beetle Collective](#) – Addressing the impacts of the very serious mountain pine beetle outbreak in the area, through intergovernmental cooperation between Federal and State land management agencies, and municipal and county governments.
- [Ashland Forest Resiliency Stewardship Project](#) – Implementing landscape scale treatments of Ashland’s municipal watershed in an effort to restore fire-adapted ecosystem, improve water quality and provide economic and social benefits to the community. Multiparty partnership and monitoring includes municipal, Federal, and NGO collaborators. More at [this project’s website](#).
- [Wallow Fire](#) - When the Wallow Fire tries to burn into the communities of Alpine and Greer, a “triple punch” helps to thwart and stop this high-intensity crown fire before it reaches homes.

## Resources for Connecting Nationally

- [www.forestsandrangelands.gov](http://www.forestsandrangelands.gov)
- [Fire Adapted Communities at fireadapted.org](http://FireAdaptedCommunities@fireadapted.org)

## Topics of interest in followup to the Western Region’s Strategy Assessment

- [Enhancing Collaboration](#)
- [Home and Homeland](#)
- [Community Protection](#)
- [Fully Utilizing Existing Authorities](#)
- [Using Economic Principles to Achieve Ecosystem Objectives](#)

## Western Region



### Cohesive Wildland Fire Management Strategy National Goals; Collective Solutions

Response to Wildfire  
Fire Adapted Communities  
Resilient Landscapes  
Supported by Science

[Welcome](#) [About Us](#) [About You](#) [Reports](#) [Contact Us](#)

### Reports

#### [Preliminary Alternatives and Performance Measures](#)

From **June 11** through **July 10** we collected feedback on the preliminary alternatives and performance measures being developed by the Western Regional Strategy Committee. The comment period is now closed but you may access the material reviewed at the link above.

#### WRSC General Updates

- [August 2012](#)
- [July 2012](#)
- [June 2012](#)
- [May 2012](#)
- [April 11, 2012](#)
- [December 5, 2011](#)
- [November 4, 2011](#)
- [October 21, 2011](#)
- [October 6, 2011](#)
- [September 15, 2011](#)
- [August 5, 2011](#)
- [July 15, 2011](#)
- [July 5, 2011](#)

#### Western Regional Strategy and Assessment

- [Full report \[pdf\]](#)
- [Appendix 7: Phase II Outreach and Content Analysis of Comments on Goals, Objectives and Actions \(includes communication plan\) \[pdf\]](#)
- [Appendix 8: Immediate Opportunities \(ideas submitted to the WRSC from METI\) \[pdf\]](#)
- [Content Analysis of Comments on Regional Strategy and Assessment](#)
- [Phase III Content Analysis of Comments on Preliminary Alternatives and Performance Measures](#)

#### Cohesive Strategy Reports

A National Cohesive Wildland Fire Management Strategy and the Report to Congress: The Federal Land Assistance, Management and Enhancement Act of 2009 – as well as foundational documents for this effort - is available at [www.forestsandrangelands.gov](http://www.forestsandrangelands.gov).

Find Success Stories in our  
About You section

Search our site

© Rectangular Snip

## Appendix 6 - Communications Plans and Actions - Phase III Communication and Outreach Plans

### Western Region Phase III Communication and Outreach Plan

The Western Regional Strategy Committee (WRSC) desires to continue an emphasis on stakeholder communication and outreach during Phase III of the National Cohesive Wildland Fire Management Strategy. Communication and outreach objectives identified in the Western Region's Phase II Outreach Communication Plan will persist and be built upon during Phase III, and include:

1. Engaging people affected by this strategy in its development within the timeframes identified by the Wildland Fire Leadership Council (WFLC).
2. Following a collaborative, rigorous, transparent development path.
3. Collecting data representing interests and opinions of stakeholders.
4. Using local, regional, and traditional knowledge and insights, as well as science and technology, to inform the western strategy assessment.
5. Disseminating clear and current information to stakeholders using multiple media on a routine basis.
6. Identifying and sharing on-the-ground success stories, including "key ingredients to success" that could be of immediate help to other communities or organizations.
7. Seeking input from stakeholders to develop Cohesive Strategy implementation plans, and applying their ideas and "key ingredients" associated with successful projects to implementation planning.

### Desired Outcomes for Phase III Communication and Outreach

The Western Region Outreach and Communication Plan dovetails with and supports the objectives of the National Communication Framework. This update includes activities leading to and through Strategy Implementation (February 28, 2013).

Outreach and communication efforts during Phase II provided the WRSC/WG with valuable information used to develop the Western Assessment. Efforts by the WRSC/WG to fully engage all stakeholder groups across the West was hampered by a combination of the time of year outreach was conducted and time limitations established by WFLC. As a result, opportunities remain to strengthen and expand stakeholder engagement during Phase III and set the stage for successful implementation of the Cohesive Strategy

The WRSC has identified the following desired communication and collaboration outcomes and activities to be achieved during Phase III:

- Strengthen and expand stakeholder support throughout the West and ensure all affected stakeholder "voices" are heard and engaged.
  - Share the Western Assessment - expand the dialog and stakeholder participation and continue to identify and add good ideas.
  - Seek specific input to the Goals, Objectives, Sub-Objectives, Actions and broad policy questions described in the Western Assessment.
  - Expand stakeholder support beyond that developed in Phase II by actively reaching out to engage "new voices" in the conversation.
- Continue to identify "Immediate Opportunities for Success" in the West focused on those examples where the three national goals are being met.
  - Identify and describe "key ingredients" including performance measures and metrics that effectively work on the ground.
  - Actively share and expand the application of these techniques with willing stakeholder groups.
- Facilitate agency efforts to streamline processes and increase the pace and effectiveness of implementation by taking full advantage of existing authorities to accomplish goals outlined in the Strategy.
  - Solicit ideas from successful collaborative efforts on ways to cut through process and achieve results.
  - Identify perceived and actual procedural barriers to accomplishment of work and provide guidance or materials that clarify procedural options and/or identify options to improve procedures.



- Provide tools and materials to assist the WRSC/WG in communicating with stakeholders regarding procedural options available to them.
- Actively engage with the Science Team during the Phase III effort.
  - Keep western stakeholders updated on progress, products, and opportunities to provide input.
  - Clarify what the Phase III trade off analysis is, and provide tangible descriptions of Phase III's expected outcomes to western stakeholders.
- Continue to keep the CSSC, WFEC and other Regions apprised of Western Region communication and outreach efforts.
  - Coordinate West-wide efforts with the national communication strategy and team.

## Western Region Communication Strategy Working Group Goals

The Western Region Communication Strategy Working Group's goals support the WRSC's desired outcomes for Phase III communication and outreach:

1. Strengthen and expand existing WRSC/WG stakeholder engagement and support.
2. Improve elements of the Western Assessment by providing opportunity for stakeholder comment prior to Phase III development work.
3. Create opportunities for continuous and expanded stakeholder involvement using multiple media and networks (newsletter/updates, website, social media, etc.).
4. Distribute accurate, timely information regarding Phase III objectives, progress, and participation opportunities.
5. Emphasize elements and tools for successful National Cohesive Strategy implementation that can be pursued immediately.

## Phase III Western Region Outreach and Communication Actions

A detailed action plan for the Western Region will be developed by the Communication Strategy Working Group to support the updated Western Region Outreach Communication Plan. The following actions are not intended to be all-inclusive, but illustrate the range of actions that could be taken during Phase III. In some instances, actions can achieve more than one of the desired outcomes described above:

1. Provide communication support and assistance to the WRSC/WG.
  - Assist WRSC/WG members assigned to maintain and pursue expanded stakeholder engagement by providing communication tools and outreach materials.
  - Maintain a calendar of Western CS engagements and track information from those engagements using a "trip report". The trip report will be used to record discussion topics, identify additional communication support needs, and note any immediate success story "leads".
  - Identify key opportunities for the RSC to provide NSAT with information needed to generate program option tradeoffs and performance measures and integrate those opportunities into the Western Region's communication and outreach plan.
  - Develop communication tools/messages to describe NSAT's role and purpose, and how the outcomes from the trade-off analysis may be used in implementation.
2. Provide stakeholders the opportunity to review and comment on the Western Assessment. Analyze comments and provide the WRSC a portrait of comments and stakeholder response.
3. Identify stakeholder groups that were not engaged or were inadequately represented in Phase II, and expand outreach to connect with these groups to ensure that the WRSC/WG hears from these "new voices" and engages them in the process.
  - Identify sub-regions and communities of interest not engaged (e.g., conservation groups and organizations, agency non-fire staff, business and industry, and urban stakeholders)
  - Attract and retain these groups' attention. Strive for understanding, acceptance and support for the Western Assessment and the Cohesive Strategy.

4. Identify success stories and examples of successful implementation that can be shared with Western stakeholders:
  - Identify groups and individuals that have demonstrated "on the ground" success in achieving the goals of the CS, and encourage them to support the broader application of their successful methods throughout the West.
  - Solicit ideas from successful collaborative efforts about their techniques to reduce process barriers and achieve results.
5. Use a variety of media to sustain and expand stakeholder outreach and communication to create the social connection and traction needed for a collaborative foundation for strategy implementation. Use these communication methods to enhance understanding of the Western RSC and the Strategy effort by filling in the picture of who we are, what we are doing and why.
  - Develop monthly stakeholder update messages and materials. Develop coordinated messaging that considers: current work of the NSAT, activities of the Western Region Strategy Group and Technical Group, Communication Strategy Working Group, RSC/WG activities, and collaboration and outreach activities. The activities and products of these groups will all feed into the messages developed for internal and external use.
  - Maintain a current mailing list to be used for outreach and updates
  - Maintain information on the Western Region's webpage regarding status, comment opportunities, and who and how to engage in development of the West's strategy.
    - include current updates to reflect the status of the CS Phase III
    - include success stories gleaned from around the West
    - describe immediate actions that can be taken to move communities toward the three goals of the CS
    - promote any opportunities for stakeholders to comment on the development of Phase III

## Appendix 7 - Useful Links

### National Cohesive Wildland Fire Management Strategy Foundational Documents

2009 Quadrennial Fire Review (QFR),

[http://www.iafc.org/files/wild\\_QFR2009Report.pdf](http://www.iafc.org/files/wild_QFR2009Report.pdf)

National Policy Framework Documents including:

- *A Call to Action*, 2009, [http://forestsandrangelands.gov/strategy/documents/call\\_to\\_action\\_01232009.pdf](http://forestsandrangelands.gov/strategy/documents/call_to_action_01232009.pdf)
- Artley, Donald, *Wildland Fire Protection and Response in the United States The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government*. International Association of Fire Chiefs, 2009 (Missions Report). <http://forestsandrangelands.gov/strategy/documents/wildlandfireprotectionandresponseusaug09.pdf>
- *Mutual Expectations for Preparedness and Suppression in the Interface*, [http://forestsandrangelands.gov/strategy/documents/mutual\\_expectations\\_2010.pdf](http://forestsandrangelands.gov/strategy/documents/mutual_expectations_2010.pdf)
- *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-Year Strategy Implementation Plan*. Western Governors Association, 2006, [http://forestsandrangelands.gov/resources/plan/documents/10-yearstrategyfinal\\_dec2006.pdf](http://forestsandrangelands.gov/resources/plan/documents/10-yearstrategyfinal_dec2006.pdf)

### Reference Documents

A National Cohesive Wildland Fire Management Strategy, 2010.

[http://forestsandrangelands.gov/strategy/documents/reports/1\\_CohesiveStrategy03172011.pdf](http://forestsandrangelands.gov/strategy/documents/reports/1_CohesiveStrategy03172011.pdf)

Federal Land Assistance, Management and Enhancement Act of 2009 Report to Congress, 2010.

[http://forestsandrangelands.gov/strategy/documents/reports/2\\_ReportToCongress03172011.pdf](http://forestsandrangelands.gov/strategy/documents/reports/2_ReportToCongress03172011.pdf)

Jakes, P. et al. Improving Wildfire Preparedness: Lessons from Communities Across the U.S., *Human Ecology Review*, Vol 14, No 2, 2007, Society of Human Ecology.

<http://www.sfrc.ufl.edu/faculty/monroe/jakesetal.pdf>

O’Laughlin, Jay. 2011. “Federal Land as a Percentage of Total State Land Area,” Fact Sheet #8, Policy Analysis Group, College of Natural Resources, University of Idaho, Moscow. Available online at <http://www.cnrhome.uidaho.edu/default.aspx?pid=120573>

Western Regional Strategy Committee. 2011. *A National Cohesive Wildland Fire Strategy: Western Regional Assessment*. September 30, 2011. 61 p.

## Appendix 8 - Committee and Work Group Members

### West Region Strategy Committee – as of October 2012

Doug MacDonald	Co-Chair/WFEC Liason- IAFC
Corbin Newman	Co-Cair/Regional Forester, FS
Robert Cope	Lemhi County, ID – NACo
Pam Ensley	FWS
Sam Foster	Station Director, FS
Bob Harrington	MT State Forester, NASF
Tony Harwood	Confederated Salish and Kootenai Tribes
Warren Day	USGS
John Philbin	BIA
John Ruhs	BLM
Sarah Craighead	NPS
Ann Walker	WGA
Dick Bahr	NPS
Joe Freeland	BLM
Leon Ben	BIA
Tom Quigley	NSAT/Contractor
Joe Stutler	IAFC (resigned 7/1/12)

### West Region Work Group

Joe Freeland	Team Lead/BLM
Carol Daly	Co-Lead/Flathead Policy Center
Alan Quan	FS
Bill Avey	FS
Bill Tripp	Inter-Tribal Council
Travis Medema	Oregon Dept. of Forestry/NASF
Alan Ager	FS
Craig Glazier	Local Government
Eric Knapp	FS
Jesse Duhnkrack	NPS
Joshua Simmons	BIA
Kevin Ryan	FS
Laura McCarthy	TNC
Lynn Jungwirth	Watershed Research and Training Council (WRTC)
Sue Stewart	FS
David Seesholtz	FS PNW Research Station
Joe Stutler	IAFC (resigned 7/12)

### West Region Technical Work Group

Carol Daly	Flathead Policy Center
Joe Freeland	BLM
Tom Quigley	NSAT/Contractor
Alan Quan	FS
Bill Tripp	Inter-Tribal Council
Jesse Duhnkrach	NPS
Kevin Ryan	FS
Laura McCarthy	TNC
Karen Prentice	BLM
Cheryl Renner	WGA/Contractor
Geoff McNaughton	Utah State
Jay O'Laughlin	University of Idaho
Chuck Bushey	IAWF
Brad Washa	BLM
Joe Stutler	IAFC (resigned 7/12)

### West Region Strategic Work Group

Carol Daly	Flathead Policy Center
John Ruhs	BLM
Ann Walker	WGA
Joe Freeland	BLM
Tom Quigley	METI/NSAT
Alan Quan	FS
Doug MacDonald	WFEC Liason/IAFC
Laura McCarthy	TNC
Tim Burke	BLM
Caitlyn Pollihan	WFLC/USFS
Danny Lee	USFS/NSAT
Jim Fox	UNC/NSAT
Matt Hutchins	UNC/NSAT
Dick Bahr	NPS
Sarah Craighead	NPS
Joe Stutler	IAFC (resigned 7/12)



## West Region Communication Work Group

Carol Daly	Flathead Policy Center
Ann Walker	WGA
Joe Freeland	BLM
Bill Tripp	Inter-Tribal Council
Kevin Ryan	FS
Lynn Jungwirth	WRTC
Laura McCarthy	TNC
Steve Solem	METI
Jim Golden	METI
Julie Woldow	METI
Shelley Gregory	BLM-Wyoming
Terina Mullen	BLM-Montana
Judith Downing	FS
Erin Darboven	OWF
Mary Jacobs	National League of Cities
Candace Iskowitz	IBHS
Mark Beighley	METI
Michelle Medley-Daniels	WRTC
Jon Skinner	BLM
Pam Leschak	FS
Jennifer Myslivy	BLM-New Mexico

