

## PARTNERS IN WILDLAND FIRE PREPAREDNESS: LESSONS FROM COMMUNITIES IN THE U.S.

Pamela J. Jakes  
USDA Forest Service, North Central Research Station, U.S.

Linda Kruger  
USDA Forest Service, Pacific Northwest Research Station, U.S.

Martha Monroe  
University of Florida, U.S.

Kristen Nelson  
University of Minnesota, U.S.

Victoria Sturtevant  
Southern Oregon University, U.S.

### INTRODUCTION

By almost any measure, the past decade has been severe in terms of wildland fire in the United States (Table 1)<sup>1</sup>. The National Interagency Fire Center (NIFC) maintains a list of "Historically Significant Wildfires" in the U.S.—fires that are significant in terms of acres burned, value of the resources destroyed, or lives or property lost. Of the 34 significant fires listed by NIFC, half have occurred since 1990.<sup>2</sup> Many of these fires burned in the wildland-urban interface—the area where homes and other structures or human development intermingle with undeveloped wildland or vegetative fuels.<sup>3</sup> As many structural fire fighters can attest, fire protection no longer focuses exclusively on building materials and design, but must include vegetation near the structure and across the landscape. Similarly, wildland fire fighters are finding that they now spend a significant portion of their resources protecting homes rather than forests and other natural assets. As observed by a ranger on the Custer National Forest in the state of Montana, "We're not fighting fires in the woods anymore but saving houses."

Recent decades have also seen a change in the fire fighting philosophy of public land management agencies in the U.S.—from a philosophy focused on fighting wildland fire to one that seeks to prepare for wildland fire.<sup>4 5 6</sup> Communities can contribute to wildland fire preparedness efforts by taking steps that reduce the probability of wildland fire. However, they also need to be prepared if

Table 1. Annual U.S. wildland fire statistics by year, 2000-2003<sup>7</sup>

Category	Year			
	2000	2001	2002	2003
Number of fires	122,827	84,079	88,458	85,943
Number of acres burned (1,000 acres)	8,422	3,571	6,938	4,918
Number of structures burned	867	731	2,381	Not available
Suppression costs (billion U.S. dollars)	1.3	0.5	1.6	1.3

Table 2. A guide to locations discussed in the study of wildland fire preparedness in the U.S.

Community	City/Town	County	State
Applegate Watershed	Medford Grants Pass	Jackson Josephine	Oregon
Bend	Bend	Deschutes	Oregon
Berkeley Township		Ocean	New Jersey
Central Pine Barrens	Eastern Long Island	Suffolk	New York
Colville Indian Reservation			Washington
Drummond-Barnes	Drummond Barnes	Bayfield	Wisconsin
Gunflint Trail	Grand Marais	Cook	Minnesota
Northern Black Hills	Spearfish Lead	Lawrence	South Dakota
Palm Coast	Palm Coast	Flager	Florida
Red Lodge	Red Lodge	Carbon	Montana
Roslyn	Roslyn	Kittitas	Washington
Sandhill Crane National Wildlife Refuge		Harrison Jackson	Mississippi
Tahitian Village	Bastrop	Bastrop	Texas
Waldo	Waldo	Alachua	Florida
Wedgfield	Orlando	Orange	Florida

prevention efforts fail by taking steps that minimize the negative impacts of a wildland fire and help facilitate response, recovery, and restoration.

A recent study of community wildland fire preparedness in 15 communities across the U.S. focused on (1) the steps taken by communities to increase their wildfire preparedness, and (2) the social conditions necessary to implement and sustain these steps (Table 2).<sup>8</sup> This paper analyzes data from key informant interviews conducted in each community to identify partners critical to successful wildland fire preparedness in the 15 communities, and actions taken by partners to support preparedness.

#### DEFINING PREPAREDNESS

Wildland fire is considered a natural hazard—a threat “to life, well-being, material goods, and environment from extremes of natural processes.”<sup>9</sup> An important dynamic to understand with any natural hazard is the human role, both in potentially creating or exacerbating the hazard and in trying to decrease exposure and damage or loss. With wildland fire, suppression has created conditions that are more likely to produce large-scale wildland fires, and people moving into wild areas are both more vulnerable to wildland fire and contributing to a heightened hazard.

Preparedness includes any action taken in anticipation of a natural hazard. Gillespie et al.<sup>10</sup> recognize four stages in managing disaster: mitigation, preparedness, response, and recovery. Mitigation activities eliminate or reduce the probability of a disaster or help to minimize negative consequences. Preparedness actions are undertaken prior to a disaster to improve response and/or recovery. In this paper we group preparedness and mitigation, and label all activities that take place prior to a wildland fire as “preparedness.” Drabek offers some support for this grouping in that he finds the line between mitigation and preparedness “is somewhat blurry.”<sup>11</sup>

## Human Behaviour in Fire Symposium 2004

### A MODEL OF COMMUNITY PREPAREDNESS

A model of community preparedness for wildland fire has been developed to help explain the roles played by individual/homeowner decisions, organizational decisions, and collective decisions in the implementation of actions that support community wildland fire preparedness (Figure 1). The assumption underlying this model is that individuals can come together to make collective decisions to take action as a community to maintain or improve wildland fire preparedness. In addition, organizations, including various federal land management agencies, state resource management agencies, city councils, non-governmental organizations, and neighborhood associations, can make decisions to take community-level actions to improve wildland fire preparedness. This paper seeks to identify who is making the decisions that result in actions being taken to improve community wildland fire preparedness.

### PARTNERS IN WILDLAND FIRE PREPAREDNESS

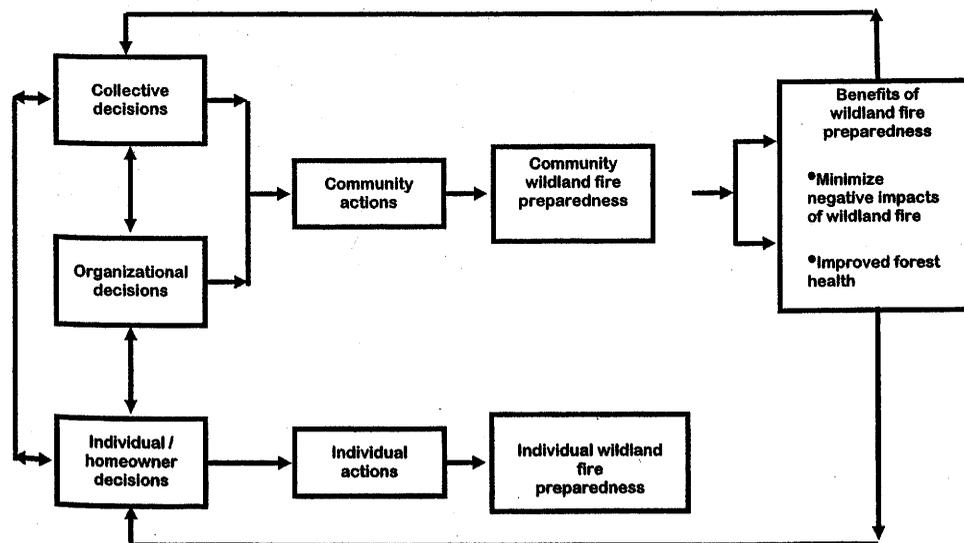
The interface fire problem is not just the responsibility of land managers. Many other groups must share responsibility for solving the problem—fire protection agencies, homeowners, local and regional planners and governing bodies; builders, contractors, and building and landscape architects; and insurance carriers and mortgage bankers.<sup>12</sup>

From the 15 case study communities, key partners are identified who have been critical to wildland preparedness at the national, state, and local levels. Examples of specific actions taken by different partners are offered.

#### National Partners in Wildland Fire Preparedness

In the U.S., the federal government plays a number of roles in wildland fire preparedness. The key agency for disaster management in the U.S. is the Federal Emergency Management Agency (FEMA), which has long been known for its immediate and urgent response to disasters. FEMA can trace its beginnings to 1803 when the U.S. Congress passed its first disaster legislation to help a town in New Hampshire recover from fire. By the late 1970's more than 100 federal agencies were involved in

Figure 1. A model of community wildland fire preparedness focusing on decisions, actions, and benefits



disasters, hazards, and emergency management. In 1979, President Carter brought all those responsibilities together in FEMA. In a proactive move, FEMA has supported community wildland fire preparedness through Project Impact.

The overall goal of Project Impact was to make communities more resistant to the damaging effects of disasters. One of the first communities to receive Project Impact funds for wildland fire preparedness was Bend, Oregon.<sup>13</sup> A subdivision in Bend was built with only one access road, a common situation that can severely restrict the ability of a neighborhood to evacuate and hamper the movement of trucks and other necessary emergency equipment and staff. Project Impact funds were used to create an emergency egress over a railroad track. This egress is closed except in an emergency, when the gates open and people can cross the tracks as an alternative means of escape.

In other examples, educational materials developed in Bend, Oregon with Project Impact funds were adapted by the Project Impact coordinator in Harrison County, Mississippi. In Mississippi, Project Impact has focused primarily on hurricanes and flooding. However, in the counties around the Mississippi Sandhill Crane National Wildlife Refuge (Sandhill Crane Refuge), expanding wildland urban interface and build-up of fuels influenced the Project Impact coordinator to develop a "wildfire defense" brochure to address local concerns and conditions. In other cases, a FEMA grant awarded to Orange County, Florida was used to hire a part-time wildfire education specialist. The Gunflint Trail Volunteer Fire Department (GTVFD) in northeastern Minnesota received a FEMA grant to purchase a portable pump to provide a high-volume source of water.

Recently, FEMA made the decision to no longer sponsor Project Impact, although several states still use the Project Impact label for their preparedness initiatives. This move by FEMA has raised concern that the agency will return to its historic focus on the immediate and urgent aspects of disaster response rather than the effective pre-disaster preparedness measures, or disappear within the Department of Homeland Security where it was placed in 2003.<sup>14 15</sup>

Additional federal support for community wildland fire preparedness is provided through the National Fire Plan (NFP). The National Fire Plan commits the U.S. Department of Agriculture Forest Service (Forest Service) and land management bureaus of the U.S. Department of the Interior to the development of programs and projects that will help protect communities and natural resources, and most importantly the lives of fire fighters and the public, from wildland fire. A 10-year comprehensive strategy for carrying out the plan focuses on four goals: (1) improve wildland fire prevention and suppression, (2) reduce hazardous fuels, (3) restore fire-adapted ecosystems, and (4) promote community assistance. Over the past four years a number of projects have been developed in support of these goals.<sup>16</sup> For example, in the northern Black Hills of South Dakota, the city of Lead is using NFP funds to map water sources and high-risk fuels. They have also used these funds to conduct prescribed burns to reduce fuels. In Jackson County, Mississippi, NFP funding has been used for training and to purchase personal protective equipment for local volunteer fire departments. In Oregon's Applegate Watershed, NFP funding has helped more than 600 residents improve their preparedness by creating defensible space or improving access to their homes.<sup>17</sup> Despite these examples of the application of NFP funds to support community wildland fire preparedness, there is some concern that only a small portion of the hundreds of millions of dollars that have been allocated to the states for wildland fire management activities has actually reached communities:

The majority of the funds go to federal land management agencies to suppress wildfire and reduce hazardous fuels on public lands that may adjoin communities under threat.<sup>18</sup>

Beyond funding, national-level agencies can model fire preparedness behavior. Federal land management agencies such as the Forest Service, Bureau of Land Management, National Park Service, Fish and Wildlife Service, and Bureau of Indian Affairs play an important role as "good neighbor" in the effort to model community preparedness for wildland fire. In the northern Black

## Human Behaviour in Fire Symposium 2004

Hills south of Spearfish, South Dakota, the U.S. Fish and Wildlife Service conducted a fuels reduction project at the DC Booth Fish Hatchery.<sup>19</sup> New, Firewise landscaping was installed, and signs were posted through out the Hatchery grounds explaining the project and the role of wildland fire in local ecosystems. Hiking trails are being planned for the area which will serve as fuel breaks. Near Red Lodge, Montana, the Custer National Forest is home to a large number of special-use cabins—privately owned cabins constructed in dense lodgepole pine on National Forest land.<sup>20</sup> The Forest Service has designed a hazardous fuel reduction project for these cabins. The focus is on creating several “show-me” cabins that will serve a model for other homeowners in the area.

Federal agencies can help build wildland fire preparedness through a variety of other activities in planning, training, and resource sharing. Federal land management agencies establish evacuation zones—a place of relative safety (for example, a gravel pit) where people can gather in case of a wildland fire. Along the Gunflint Trail in Minnesota these areas were labeled “safety zones” until concern about liability forced a name change. Federal agencies are very active in providing training to state and local fire fighters and emergency services personnel. For example, federal agencies in Mississippi and New York have established wildfire academies to qualify staff of federal, state, county, and local agencies as wildland fire fighters. Federal agencies also make available to local communities used wildland fighting equipment and other excess property. In one “camp” in Montana, the Forest Service gave the local residents a water pump to use in defending their property against wildland fire. Finally, federal land management agencies play a role in educating the public about wildland fire in the landscape, fuels management techniques, and how they can take personal responsibility for reducing the risk on their properties. Federal agency staff also need to support individuals, organizations, and communities when they seek new or additional information. When assessing the role of the Forest Service in wildland fire preparedness around Red Lodge, a local resident observed, “Seems like the district ranger is as important as the mayor.”

Non-governmental organizations (NGO) are also involved in wildfire preparedness. The Nature Conservancy seeks to preserve biological diversity by protecting lands and waters. Fire is seen as an essential element for shaping and sustaining ecosystems, and TNC actively uses fire to restore ecosystems. These restoration efforts can often play a role in reducing hazardous fuels near communities. For example, in Jackson County, Mississippi, TNC used prescribed burning for ecosystem restoration on a plot of land located between two tracts of the Sandhill Crane Refuge. The project reduced hazardous fuels in an area adjacent to valuable wildlife habitat. Although not in any of the 15 case study communities, the Student Conservation Association’s Fire Education Corp is an example of an NGO that trains students to work with homeowners in the wildland-urban interface to create defensible space around their properties and reduce the risk from wildland fire. Students are currently working in communities in 13 states, offering free home evaluations, organizing community fuel reduction projects, and mapping communities to improve fire response.

### State Partners in Wildland Fire Preparedness

States play a role in community wildland-fire preparedness through organizational arrangements, programmatic decision, and access to funding.<sup>21</sup> State agency staff can be uniquely placed to serve as a conduit between federal agencies and local communities. As a Montana Department of Natural Resource Conservation employee stated, “We [provide] what I think is a pretty crucial link between the federal agencies and we counties. [We are] agency people, and yet we are closer to the counties than the federal agencies tend to be.”

In states with very little federal land, state agencies take the lead in wildfire mitigation, preparation, and suppression. The Texas Forest Service (TFS) coordinates several programs to provide equipment for volunteer fire departments as well as a large training academy that provides professional development. TFS has also developed several education programs that enable communities to promote wildfire preparedness. Similarly, the Florida Division of Forestry works closely with the Department of Emergency Response to develop Firewise communities, provide educational materials, conduct mitigation projects, and train fire fighters from state and local agencies. In New Jersey, it is

the state Forest Fire Service that is legally responsible for wildfire in all natural areas and even fire protection for many municipalities. They play an active role in coordinating fuel treatments and public education across political boundaries.

States can play a critical role as initiator in community wildland preparedness, especially in communities with low social capacity or human capacity. For example, in northwestern Wisconsin, the Department of Natural Resources ranger took responsibility for educating the public and coordinating preparedness activities between agencies and local industry.<sup>22</sup>

Most states serve as the pass-through organization for NFP funds. In South Dakota NFP funds are used to support the State's 50-50 cost share program that helps private property owners improve wildland fire preparedness. The funds cover the costs of private contractor or the landowner to create fuel breaks, remove brush, or take other action to improve preparedness. In Montana, the Department of Natural Resources and Conservation is using NFP funds to develop demonstration home sites "to show people that you can do defensible space treatments and still maintain [a] beautiful property."

There are a range of other actions that states can take to improve wildland fire preparedness. States can enact laws and regulations. In Oregon, if there is a fire on a property and it is determined that the owner had not managed fuels on that property, the owner is liable for up to \$100,000 for the cost of fighting the fire. In Florida, a Right-To-Burn law provides liability protection for certified burners who use prescribed fire to manage private lands. States can also work with town or county planning departments to develop local growth policies, subdivision regulations, and other land use restrictions. They can support state-wide mutual aid agreements, so that fire and other emergency personnel will respond from across the state when a community is in danger. Even something as non-controversial as designating Wildland Fire Awareness Week or Prescribed Fire Awareness Week, as they have in Florida, can raise awareness of wildland fire preparedness.

### Local Partners in Wildland Fire Preparedness

One of the major findings following the 1998 wildland fires in Florida was the need for improved local-level planning to mitigate wildland fire danger.<sup>23</sup> County and local government often play a lead role in the development of comprehensive or land-use plans that specify the locations of future growth and development, which can play a significant role in long-term wildland fire preparedness.<sup>24</sup>

In addition to planning, the enactment of local codes, standards, and zoning that restrict development or mandate fuels reductions are seen as effective tools for cities and local governments to increase community wildland preparedness.<sup>26</sup> As observed in Red Lodge, Montana, "You need to have good subdivision regulations because what you do is start to change the landscape a little bit, and as you do that people start to see that and then it starts to affect the way they see new development." In a report for the Council of Western State Foresters, it was observed that codes, regulations, and building standards that would increase community wildland fire preparedness exist, but that few governments have the public or political will to implement them.<sup>27</sup> There are, however, communities who have stepped forward. In Palm Coast, Florida, the city notifies a property owner if they need to remove vegetation to reduce hazardous fuel.<sup>28</sup> Upon notification, the owner must remove the vegetation themselves or have the city perform the service and cover the costs. If the owner does neither, the city will clear the underbrush and charge the owner the cost plus a fine. If no payment is made, the city will place a lien on the property that must be paid before the lot can be sold or developed. Local governments may not need to adopt new ordinances to support wildland fire preparedness, but to enforce ordinances that are already on the books. That was the case in the northern Black Hills of South Dakota where Lawrence County has had a fuels management code since 1992, but only recently started enforcing the ordinance. Alachua County, Florida has taken a more proactive stance with hazard mitigation built into the comprehensive plan and land development regulations. Before new construction is approved, the risk of wildfire must be evaluated and mitigated.

## Human Behaviour in Fire Symposium 2004

There are other steps local levels of government can take to support wildland fire preparedness. Although the budgets of local government are often extremely limited, there are examples of local government supplementing ongoing community preparedness efforts. Deschutes County, Oregon contributes to wildland fire preparedness by funding the coordinator position for Project Impact. This allows Project Impact funds to be used solely for wildland fire preparedness projects. Research has shown that communication during a wildland fire can be critical in terms of guaranteeing the safety of community residents. Reverse-911 telephone systems are a widely accepted technique employed by local levels of government to increase wildland fire preparedness. These systems allow emergency management personnel to notify residents of an impending emergency or disaster. Cities and towns can model defensible space and responsible fuels management in their parks and other public land. As observed by a city official in Lead, South Dakota, "We want to set an example of how to manage property by doing it on our land... We hope that might spur some people to do some work on their own property."

In most of the 15 case study communities, the local fire department was identified as having primary responsibility for ensuring that the community is prepared for wildfire. Many of the preparedness activities of local fire departments focus on obtaining necessary equipment and training to fight wildland fire. They are also a valuable source of information for residents about what they can do to prepare for wildland fire. One way the help residents prepare is through home risk assessments. As the Chief of the Gunflint Trail Volunteer Fire Department (GTVFD) in northeastern Minnesota was short of staff to undertake this valuable service, he trained his emergency medical technicians (EMT) to do the assessments. This both increased his pool of people able to work with homeowners and qualified the EMTs for a state-supported fire fighter benefits program.<sup>29</sup>

Businesses and local organizations are important partners in community wildland fire preparedness. The Fire Council of Carbon County, Montana has worked with the county commissioners to create subdivision regulations that increase fire safety in the wildland-urban interface.<sup>30</sup> In Bend, Oregon, the SAFECO Insurance Company covered significant losses incurred in the 1990 and 1996 wildland fires.<sup>31</sup> Recognizing that something could be done to reduce potential future losses, they provided—at the suggestion of the city fire marshal—funding to initiate a public education campaign, FireFree. FireFree is catching the interest of communities throughout the state, and the Oregon Department of Forestry, with the help of SAFECO and a National Fire Plan grant, is facilitating adoption of FireFree in other communities

Private businesses can also model fuels management on their property. The Homestake Gold Mine is credited with carrying out one of the largest fuel reduction projects in South Dakota. In 1960-1961 the company constructed a trench around the city of Lead to protect company property and structures from natural disasters. It was the perfect prescription for reducing fuels around Lead. Unfortunately, the moat was not maintained and vegetation was allowed to grow. Also in the northern Black Hills, timber companies and developers have worked together to create subdivisions that have undergone fuels reduction prior to home construction. Both businesses benefit as the timber company retains the merchantable logs removed during treatment and the developer markets a subdivision that is perceived safe and labeled "firewise."

Neighborhood and landowner associations can serve as a strong foundation for organizing wildland fire preparedness.<sup>32 33</sup> Every summer along the Gunflint Trail, the area homeowners associations hold a canoe race to raise funds for the GTVFD. Covenants in neighborhoods can have a major impact on community wildland fire preparedness. Near Orlando, Florida, one community revised their covenants to address the need for driveway gates wide enough for emergency equipment, and specify vegetation management requirements related to pruning of trees.

There are other local partners to draw on when maintaining or improving wildland fire preparedness. In Jackson County, Mississippi, the Boy Scout Council has incorporated the role of wildland fire in its annual programs at the local camp. In Bend, Oregon, the Oregon High Desert Museum has modeled effective fuel reduction on its property. The Museum has also sponsored an educational series on fuel

ecology. In Florida, Wedgefield draws in a number of partners as it spreads the wildland fire preparedness message at events like the annual golf tournament, community garage sale, and garden show. Successful communities build preparedness by using windows of opportunity to educate the public and by celebrating their successes. Even local golf courses can be enlisted to serve a significant role in community wildland fire preparedness as fire breaks and as evacuation zones.

Of course, there would be no community preparedness without the actions of individuals. Citizen support is essential for the successful implementation of fuels management programs.<sup>34</sup> In the case study communities, one individual was often the spark that ignited local community wildland fire preparedness efforts. Following a fire that destroyed 70 homes and caused the entire county to be evacuated, local residents of Palm Coast asked why no one had informed residents in the subdivision of the high fire risk. One individual attended all of the county commission meetings, raising questions and prompting actions. He held the county commissioners accountable for the lack of information or efforts to reduce hazardous fuels, paving the way for a change in the elected leadership and enactment of new codes and regulations. In the Drummond-Barnes area, it has been one Wisconsin Department of Natural Resources employee who has worked to raise awareness of local residents of wildland fire risk. In the Applegate Watershed, two individuals were responsible for holding the community together through the ups and downs of developing the Applegate Fire Plan. One of their neighbors suggested that these individuals should be named "Oregon State Man and Woman of the Year" for their accomplishments. What makes these individuals and others like them successful is that they not only model preparedness on their own property, but they can access networks, build partnerships, and motivate others to develop community wildland fire preparedness. In Figure 1, it's the difference between an individual who operates at the lower level of the model, focusing on individual wildland fire preparedness, and an individual who moves to the upper levels of the model to build community preparedness.

### COLLABORATION IN SUPPORT OF WILDLAND FIRE PREPAREDNESS

Most of the examples of wildland fire preparedness discussed above focus on one agency or group; however collaboration is often cited as a key for increasing or improving community wildland fire preparedness.<sup>35 36 37</sup> The Healthy Forests Restoration Act of 2003 emphasizes the need for federal agencies to work collaboratively with communities in planning and implementing hazardous fuel reduction projects.<sup>38</sup> In a major effort to synthesize the literature related to wildland fire and collaboration, Sturtevant and colleagues discuss many of the challenges and benefits of collaboration, and share the opinion that collaboration results in better projects.<sup>39</sup> Below are several examples of how agencies, organizations, and groups are collaborating to build wildland fire preparedness.

The federal land management agencies have joined 36 other partners to sponsor Firewise, a national program that supports community workshops to empower communities to (1) improve safety by learning to share responsibility, (2) create and nurture local partnerships for improved decisions, and (3) encourage the integration of Firewise concepts into community and disaster mitigation planning. Wedgefield, Florida, was one of the pilot Firewise communities. The Firewise assessment tool, developed specifically for Wedgefield, guides homeowners through an evaluation of their wildland fire risk, giving them ownership of the assessment and the plan for action. The Wedgefield Firewise Committee has been incorporated as a non-profit organization, allowing them to accept donations and to qualify for different grants and other funding opportunities. Local residents say that the key to the success of Firewise in Wedgefield has been the strong committed local leadership. A Firewise workshop held in Spearfish, South Dakota is credited with mobilizing the community for wildland fire preparedness. Local residents, businesses (including insurance and banking), developers, land management agencies, and emergency response groups came together to learn what could be done at the household, neighborhood, and community level to increase wildland fire preparedness.

The Applegate Fire Plan represents a highly collaborative community-driven process to plan fuels reduction projects on public and private land.<sup>40</sup> For the federal and state agencies involved, the Plan solidifies a process that has been on-going for decades: gathering information, balancing priorities,

## Human Behaviour in Fire Symposium 2004

planning strategies, and cooperating across property lines—but this time the process occurs in dialogue and partnership with one another and community members.

The Tri-County Fire Cooperative in southern Mississippi brings together a diverse group of partners, from the Mississippi Sandhill Crane National Wildlife Refuge to the Mississippi Forest Commission to the County Fire Coordinators, to promote prescribed burning to reduce hazardous fuels in wildland urban interface areas. The Cooperative is funded by the Coastal Impact Assistance Program, which obtains its funds from royalties from off-shore drilling.

In Tahitian Village, a subdivision of Bastrop, Texas, the Texas Forest Service, local volunteer fire departments, Civic Association, and Tahitian Village Property Owners Association held meetings with homeowners to introduce them to the basic concept of wildland fire mitigation.<sup>41</sup> As a result of the initial meeting, five homeowners volunteered their homes as sites for defensible space demonstration areas. Another community wildland fire preparation initiative, the Tahitian Village Wildfire Mitigation Program, was generating only minimal interest among property owners. The Program decided to try something new—have homeowners complete their own hazard assessment. This allowed the organizers to spend meeting time discussing what homeowners could do to mitigate hazards, rather than how to interpret assessments that had been done for them by professionals.

In Roslyn, Washington, the Washington Department of Natural Resources, Kittitas County Fire Marshal, USDA Forest Service Cle Elum Ranger District, and local fire departments and fire districts created a 150- to 200-foot-wide shaded fuel break around Roslyn, the adjacent town of Ronald, and along the highway corridor connecting the two.<sup>42</sup> The object of the shaded fuel break is not to stop a wildland fire, but to keep it on the ground and of low intensity so crews will have a better chance of controlling the fire. Another collaborative effort in Roslyn has raised the wildland fire preparedness awareness of local school children. While creating the shaded fuelbreak, agencies were also identifying local evacuation areas for residents to use in the case of an emergency. They selected the Roslyn school grounds as one potential evacuation site, and undertook activities to improve the school's defensible space.<sup>43</sup> Students were curious about what was occurring, and question teachers about the activities. To help quench the curiosity of the students, a Jr. Firewise Program was developed by teachers, the County Fire Marshal, and the fire management officers from the Department of Natural Resources and Forest Service. Incorporated into the middle school curriculum, the program has students design model homes with Firewise construction and landscaping, culminating in an event where the students burn their model properties.

## CONCLUSIONS

Findings from case studies conducted in 15 communities across the U.S. show that activities to support wildland fire preparedness can be championed, developed, and carried out by a diverse group of agencies, organizations, and individuals.

Earlier findings from the case studies highlighted the importance of four key elements in building community preparedness: landscape, government capacity, human capacity, and social capacity.<sup>44</sup> This discussion of partners in community preparedness illustrates the importance of these four elements. The landscape element is closely related to the concept of natural capital, which focuses on nature's economic goods and services.<sup>45</sup> Each of the partners discussed here are reacting to hazardous conditions existing in the landscape. But, perhaps more importantly, they are responding to where they find themselves in the landscape—in an isolated valley, a "peninsula" of private land surrounded by public land, or in an intermix with convoluted jurisdictions. In many cases it is where people and organizations find themselves in the landscape that motivates them to become involved in community wildland fire preparedness. Government involvement is critical because government at all levels has the capacity to access funds, equipment, and talents that might not otherwise be found in the community. It is extremely difficult for communities to build preparedness without involvement by some level of government. The examples offered above also highlight projects where individual community members have applied their knowledge and skills to improve community wildfire

preparedness. The talents brought by individuals to wildland fire preparedness are best described as human capital—referring to the knowledge, skills, and abilities individuals develop and accumulate over time either through education, training, and/or culture. By focusing on the role of individuals to community wildland fire preparedness, the value of the individual to the overall process is demonstrated, and others within the community are empowered to become involved. Finally, social capacity refers to civic norms, leadership, and the ability to mobilization of collective resources.<sup>46 47</sup> Successful community preparedness efforts depended on community members not only being stewards of their land, but coming together for the common good. In many cases it is the social capital that enables communities to take advantage of qualified individuals and government agencies to tap creative problem solving energy that leads to preparedness. An interesting finding from the case studies related to human and social capacities for wildland fire preparedness is that preparedness activities can build as well as build on these capacities

## REFERENCES

- <sup>1</sup> National Interagency Fire Center (NIFC) (2004) Fire Statistics. *National Interagency Fire Center*, available @ [www.nifc.gov/stats/index/html](http://www.nifc.gov/stats/index/html)
- <sup>2</sup> Ibid.
- <sup>3</sup> National Wildfire Coordinating Group (NWCG) (1996) *Glossary of Wildland Fire Terminology*. National Wildfire Coordinating Group available @ [www.fire.blm.gov/training/standards/GLOSSARY.PDF](http://www.fire.blm.gov/training/standards/GLOSSARY.PDF)
- <sup>4</sup> USDA Forest Service (2004) *The Healthy Forests Initiative and Healthy Forests Restoration Act: An Interim Field Guide*. Washington, U.S. Department of Agriculture, Forest Service, U.S. Department of the Interior, Bureau of Land Management available @ [www.fs.fed.us/projects/hfi/field-guide/web/](http://www.fs.fed.us/projects/hfi/field-guide/web/)
- <sup>5</sup> Western Governors' Association (2001) *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10 Year Comprehensive Strategy*. Western Governors' Association available @ [www.westgov.org/wga/initiatives/fire/final\\_fire\\_rept.pdf](http://www.westgov.org/wga/initiatives/fire/final_fire_rept.pdf).
- <sup>6</sup> USDA Forest Service (2004) Ibid.
- <sup>7</sup> National Interagency Fire Center (NIFC) (2004) Ibid.
- <sup>8</sup> Jakes, P.J. Nelson, K. Lang, E. Monroe, M. Agrawal, S. Kruger, L. & Sturtevant, V. (2003) A model for improving community preparedness for wildfire. IN: Jakes, P.J. compiler *Homeowners, Communities and Wildfire: Science Findings from the National Fire Plan*. Proceedings of the Ninth International Symposium of Society and Resource Management, 2-5 June, 2002, Bloomington, IN. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- <sup>9</sup> Cigler, B.A. (1988) Current policy issues in mitigation. IN: Comfort, L.K. ed. *Managing Disaster: Strategies and Policy Perspectives*. Durham, NH: Duke Press Policy Studies. p.40.
- <sup>10</sup> Gillespie, G. Colignon, R.A. Mahasweta, M. Murty, S.A. & Rogge, M. (1993) *Partners for Community Preparedness*. Boulder, CO, University of Colorado.
- <sup>11</sup> Drabek, U.D. (1986) *Human System Responses to Disaster: An Inventory of Sociology Findings*. New York, Springer-Verlag. p.21.
- <sup>12</sup> David, J.B. (1990) The wildland-urban interface: paradise or battleground? *Journal of Forestry*, 88(1), p 27.
- <sup>13</sup> Sturtevant, V. & Jakes, P. (2002) *The Bend Community and FireFree: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- <sup>14</sup> Cigler, B.A. (1988) Ibid.
- <sup>15</sup> Teie, W.C. & Weatherford, B.F. (2000) *A Report to the Council of Western State Foresters: Fire in the West, The Wildland/Urban Interface Fire Problem*. Rescue, Ca, Deer Valley Press.
- <sup>16</sup> Rains, MT. & Hubbard, J. (2002). Protecting communities through the National Fire Plan. *Fire Management Today*, 62(2), pp.4-12.
- <sup>17</sup> Sturtevant, V. & Jakes, P. (2003) *The Applegate Fire Plan: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.

## Human Behaviour in Fire Symposium 2004

- Steelman, T.A. G. Kunkel, & Bell, D. (2004) Effective community responses to wildfire threats: lessons from New Mexico. *Journal of Forestry*, in press.
- Hudson, R. Lang, E. Nelson, K. & Jakes, P. (2003) *Spearfish, South Dakota and the Northern Black Hills; Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Sturtevant, V. & Kruger, L. (2004) *Red Lodge, Montana: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Steelman, T.A. G. Kunkel, & Bell, D. (2004) Ibid.
- Jakes, P.J. Nelson, K. Lang, E. Monroe, M. Agrawal, S. Kruger, L. & Sturtevant, V. (2003) Ibid.
- Long, A.J. & Monroe, M.C. (1999) New interface strategies in Florida. IN: *Proceedings of the Society of American Foresters 1999 National Convention*, 11-15 September, Portland, OR. Bethesda, MD, Society of American Foresters.
- Godschalk, D.R. (1991) Disaster mitigation and hazard management. IN: Drabek, T.E. & Hoetmer, J.J., eds. *Emergency Management: Principles and Practices for Local Government*. Washington, DC, International City Management Association.
- Britton, N.R. & Lindsay, J. (1995) Integrating city planning and emergency preparedness: some of the reasons why. *International Journal of Mass Emergencies and Disasters* 13(1), pp.93-106.
- Bailey, D.W. (1991) The wildland-urban interface: social and political implications in the 1990's. *Fire Management Notes* 52(1), pp.11-18.
- Teie, W.C. & Weatherford, B.F. (2000) Ibid.
- Monroe, M. Agrawal, S. & Jakes, P. 2003. *The Palm Coast Community:: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Jakes, P. & Nelson, K. (2002) *Gunflint Trail Community: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Sturtevant, V. & Kruger, L. (2004) Ibid.
- Sturtevant, V. & Jakes, P. (2002) Ibid.
- Jakes, P. & Nelson, K. (2002) Ibid.
- Nelson, K. Lang, E. Jakes, P. & Hudson, R. (2003) *Berkeley Township, New Jersey: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Shindler, B. (2002) Citizens in the fuel-reduction equation: problems and prospects for public forest managers. IN: Fitzgerald, S.A. ed. *Fire in Oregon's Forests: Risks, Effects, and Treatment Options*. Portland, OR, Oregon Forest Resources Institute.
- Teie, W.C. & Weatherford, B.F. (2000) Ibid.
- Kruger, L.E. Agrawal, S. Monroe, M. Lang, E. Nelson, K. Jakes, P. Sturtevant, V. McCaffrey, S. & Verrett, Y. (2003) Keys to community preparedness for wildfire. IN: Jakes, P.J. compiler. *Homeowners, Communities and Wildfire: Science Findings from the National Fire Plan*. Proceedings of the Ninth International Symposium of Society and Resource Management, 2-5 June, 2002, Bloomington, IN. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Sturtevant, V. Moote, M.A. Chang, A. & Jakes, P.J. (2005) *Social Science to Improve Fuels Management: A Synthesis of Research on Collaboration*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Society of American Foresters. 2004. *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities*. Bethesda, MD: Society of American Foresters.
- Sturtevant, V. Moote, M.A. Chang, A. & Jakes, P.J. (2005) Ibid.
- Sturtevant, V. & Jakes, P. (2003) Ibid.
- Monroe, M. Agrawal, S. & Hudson, R. (2004) *Bastrop, Texas: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.

<sup>42</sup> Kruger, L. & Sturtevant, V. (2004) *Roslyn, Washington: Steps to Improve Community Preparedness for Wildfire*. St. Paul, MN, U.S. Department of Agriculture, Forest Service, North Central Research Station.

<sup>43</sup> Kruger, L. & Sturtevant, V. (2004) *Ibid*.

<sup>44</sup> Jakes, P.J. Nelson, K. Lang, E. Monroe, M. Agrawal, S. Kruger, L. & Sturtevant, V. (2003) *Ibid*.

<sup>45</sup> Pretty, R.W. (1987) Towards sustainable food and farming systems in industrialized countries. *International Journal of Agricultural Resources, Governances and Ecology* (1)1: 77-94.

<sup>46</sup> Putnam, R. D. (1995) Bowling alone: America's declining social capital. *Journal of Democracy* 6:65-78.

<sup>47</sup> Flora, C. B. and Flora, J.L.. 1993. Entrepreneurial social infrastructure: a necessary ingredient. *The Annals of the Academy of Social and Political Sciences* 529:48-58.

Organised by



3rd International Symposium on

# HUMAN BEHAVIOUR IN FIRE

Public Fire Safety - Professionals  
in Partnership

Conference Proceedings

Europa Hotel, Belfast, UK  
1-3 September 2004

Supported by

MARKS &  
SPENCER

 Chubb



# **HUMAN BEHAVIOUR IN FIRE**

**- Public Fire Safety -  
Professionals in Partnership**

3<sup>rd</sup> International Symposium

September 2004  
Belfast, Northern Ireland, UK



**London, UK**