Community Experiences with Wildfire: Actions, Effectiveness, Impacts, and Trends

Results from two surveys in counties and communities affected by wildfire

AUTUMN ELLISON, MELANIE KNAPP, JESSE ABRAMS, MAX NIELSEN-PINCUS, TRAVIS PAVEGLIO, AND CASSANDRA MOSELEY

SPRING 2015

ECOSYSTEM WORKFORCE PROGRAM WORKING PAPER NUMBER 56

Ecosystem Workforce Program

UNIVERSITY OF OREGON

WASHINGTON STATE UNIVERSITY

University of Idaho

Portland State UNIVERSITY

About the authors

Autumn Ellison is a faculty research assistant, Ecosystem Workforce Program, Institute for a Sustainable Environment, University of Oregon.

Melanie Knapp was a faculty research assistant, Ecosystem Workforce Program, Institute for a Sustainable Environment, University of Oregon.

Jesse Abrams is a faculty research associate, Ecosystem Workforce Program, Institute for a Sustainable Environment, University of Oregon.

Cassandra Moseley is director of the Ecosystem Workforce Program and the Institute for a Sustainable Environment, University of Oregon.

Max Nielsen-Pincus is an assistant professor, Department of Environmental Science and Management, Portland State University.

Travis Paveglio is an assistant professor in the College of Natural Sciences, Department of Conservation Social Sciences, University of Idaho.

Acknowledgements

We thank the survey respondents for their time and insights.

The Community Service Center at the University of Oregon provided survey facilitation and management.

Autumn Ellison and Nathan Mosurinjohn provided design, editing, and layout of this publication.

Map credit: Nathan Mosurinjohn

Photo credits: All photos by USDA Forest Service, Coconino National Forest

This research was supported by Washington State University, the USDA Forest Service Western Environmental Threats Assessment Center, and the USDA National Institute for Food and Agriculture, Grant # 2011-67023-30695.

For more information:
Ecosystem Workforce Program
Institute for a Sustainable Environment
5247 University of Oregon
Eugene, OR 97403-5247
541-346-4545
ewp@uoregon.edu
ewp.uoregon.edu

UNIVERSITY OF OREGON

Wildfire has become a growing threat for communities across the American West and a complex concern for agencies tasked with community protection. This task has grown more difficult due to the increasing incidence of large fires and the continued expansion of the wildland-urban interface (WUI), the area where human habitations and wildland fuels abut or intermix. These trends have motivated both federal policies and community-level responses to protect communities, lives, and infrastructure.

Federal efforts have focused on empowering WUI communities to become more "Fire adapted," or capable of enduring, quickly recovering from, and learning from wildfires that might otherwise cause long-term negative consequences.[1] The Healthy Forest Restoration Act (HFRA), passed in 2003, encourages communities to build local capacity to plan for, respond to, and recover from wildfire events by giving state and federal funding priority to activities identified in Community Wildfire Protection Plans (CWPPs). HFRA allows great latitude to adapt CWPPs and the wildfire preparation efforts they detail to local contexts by offering local communities the opportunity to define their WUI boundaries, determine local values most at risk, and establish local wildfire management priorities.[2]

In the decade since HFRA's passage, a variety of research efforts have investigated how communities engage in CWPP planning,[3] how they interpret the latitude afforded in HFRA to adapt CWPPs to local contexts,[4] and how effective community action has been in improving fire adaptation.[5] In the context of both policy and action around community-based wildfire planning, an understanding of how communities choose, perceive, and evaluate recent local wildfire planning actions is important. Little is known about how individual communities prioritize actions once CWPPs are complete, or how they rate the effectiveness of different types of efforts for increasing adaptation to wildfire. A greater understanding of what local wildfire planning efforts look like and how effective they are in increasing resilience can help inform practitioners and policymakers on the best uses for limited resources, as well as the strengths and gaps of current policies and practices.

This paper explores community experiences with and perceptions of local wildfire preparedness by summarizing results from two recent surveys. These surveys, one conducted at the county scale and one at the community scale, were completed by wildfire planning participants and community leaders in places across the U.S. West that had both crafted a CWPP and experienced a recent large wildfire. This research sought a better understanding of what communities have done to prepare for wildfire and how effective these efforts have been in reducing the negative impacts from large wildfires. We also sought an understanding of how wildfire efforts at the local level have changed in the decade since HFRA was passed, and whether county officials and community leaders believed that local resilience to wildfires had increased or decreased.

Approach

To better understand the dynamics of local wildfire planning, experience, and response, we conducted phone surveys with both county-level and community-level experts involved in wildfire planning or response in places that had completed a CWPP and had recently been affected by a large wildfire. The surveys were part of a larger research effort to understand how WUI communities prepare for, respond to, and recover from large wildfire events. Altogether, survey respondents represented 52 different counties and 70 unique communities in 10 states across the American West (see Figure 1, page 3).

Respondent selection

The research project was limited to the eleven states of the U.S. West. Survey counties were selected from those determined in a previous analysis for the project, during which the research team analyzed CWPPs for counties affected by a large wildfire between 2004 and 2012. Analyzed CWPPs were available online, and large wildfires were defined as those that cost the USDA Forest Service at least one million dollars in suppression expenditures.

From the pool of counties recently affected by a large wildfire that were actively represented by a CWPP we were able to access digitally, we selected counties that had a population of 250,000 or less to ensure that surveys were focused in rural counties. We then selected counties where a recent large wildfire caused some type of evacuation, based on ICS209 daily situation reports, to eliminate fires that occurred in largely remote areas with little community impact.

County surveys

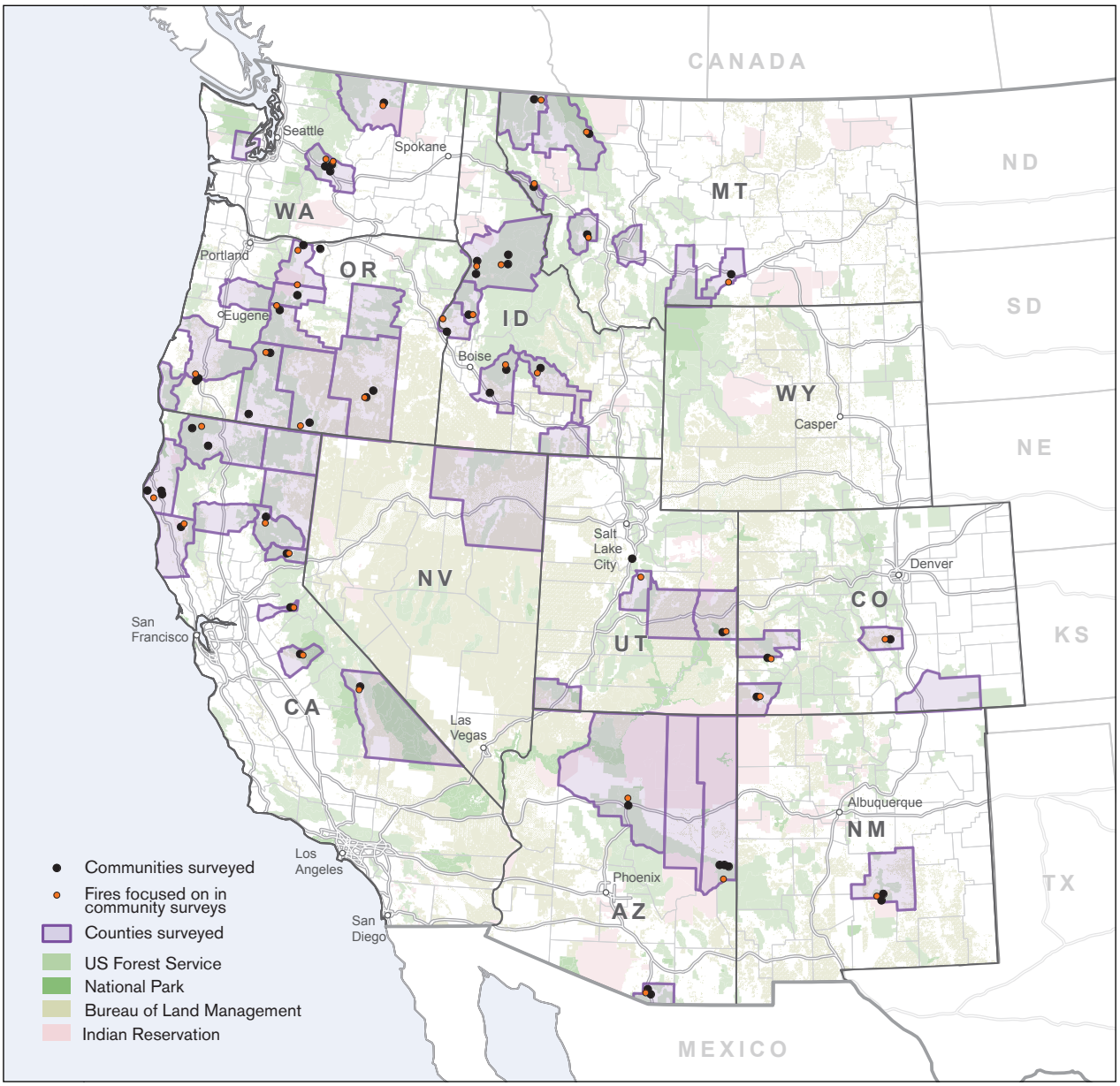
We identified 70 unique western counties that met the selection requirements. For each county, we performed web searches to collect names and contact information for the County Fire Chief, County Emergency Operations Manager, and County Planner. We contacted these officials via phone, starting with the County Fire Chief. Where these positions were unavailable, such as in smaller counties with fewer staff, the most knowledgeable county official was identified to participate; in many cases, this was the County Sheriff, a County Building Official, or a County Commissioner. When we were able to connect with an official, we confirmed whether they were the best person to take the county survey, and either proceeded with the survey or followed up with the contact they recommended. We contacted each identified official a minimum of four times over several months before considering him or her a non-respondent.

We attempted to complete one survey in each of the 70 counties. We completed surveys in 52 of our target counties for a county-level response rate of 74 percent. We confirmed that each county respondent self-identified as "knowledgeable" or "very knowledgeable" about his or her county's planning and mitigation around wildfires before proceeding with the survey. We asked county-level respondents about actions that had been or were being implemented in the county to plan and prepare for, mitigate, and respond to wildfire. They were asked to evaluate the applicable Community Wildfire Protection Plan and related processes in terms of their effectiveness at changing local wildfire preparedness and response, and to evaluate overall ten-year trends regarding wildfire planning and preparedness. Respondents were able to offer additional comments and thoughts at any point, and these were recorded throughout the survey.

Community surveys

The specific impacts of individual wildfires are spatially uneven, affecting some communities more than others. We took a multi-scalar approach by surveying community-level informants in communities affected by a large wildfire, in addition to the county level wildfire planners. Community respondents were drawn from surveys with county respondents. We asked officials in the county-level survey for information on: 1) a wildfire that occurred in their county in the last 10 years; 2) the community or communities that were affected by that wildfire; and 3) the names of individuals knowledgeable about the wildfire in those commu-

Figure 1 Counties, communities, and wildfires represented by survey respondents



nities. We sought to survey several contacts in each community when possible. We did not explicitly define community, but let county respondents delineate the area that they thought of as an affected community. Identified communities ranged from unincorporated settlements to small towns and subdivisions. Many fires span multiple counties; in three cases, surveyed communities were in a county adjacent to the county surveyed.

We surveyed 116 community respondents in a total of 70 unique communities within 36 of the surveyed counties. In 26 of these communities, we surveyed multiple respondents. All community respondents self-identified as "knowledgeable" or "very knowledgeable" about their communities' involvement in wildfire planning, response, and recovery from the noted wildfire prior to proceeding with the survey. Whereas county-level surveys focused on planning

and perceptions of wildfire preparedness across the county in general, community-level surveys focused on the impacts of a particular fire in the affected community. In total, community surveys focused on 42 different wildfires. We asked community-level respondents about local experiences with a specific wildfire threat, including the impacts it had locally, how effective certain approaches were in mitigating wildfire risk and damages, where there was room for improvement, and how local trends in wildfire planning, response, and recovery had changed in the previous ten years. Respondents were able to offer additional comments and thoughts at any point, and these were recorded throughout the survey.

Results: County surveys

County-level respondents

County-level respondents represented a range of professional positions, including emergency managers, county fire wardens, county commissioners, and others active in wildfire mitigation planning in their respective counties. A majority (56 percent) of respondents had participated in the creation of their county's Community Wildfire Protection Plan, and the vast majority (91 percent) had participated in other (non-wildfire) disaster planning efforts as well. When asked about their primary roles with respect to wildfire, 76 percent noted planning as one of their primary roles, 65 percent noted disaster preparedness, 65 percent noted emergency management or response, 61 percent noted community organizing/outreach, and 39 percent noted fuels management.

Wildfire protection activities

Efforts focused on government and organizational planning actions rather than landowner actions.

A primary objective of the survey was to gain a better understanding of the specific actions being conducted to improve wildfire preparation across the West. We asked county respondents about five categories of activities that had been or were being conducted in their county: 1) awareness and education activities; 2) planning and preparation activities; 3) administrative activities; 4) mitigation activities; and 5) emergency response activities. Categories and action items were selected from published National Fire Protection Agency (NFPA) criteria that provide the standards for disaster and emergency response programs. In total, we asked respondents whether their county had participated in 34 unique wildfire protection actions (see Table 1, page 5).

Overall, counties reported the greatest participation in administrative activities and emergency response activities, with over 60 percent of counties participating in all of the actions in both of these categories. Awareness and education activities were also popular, with more than half of the counties participating in each activity. The single most commonly completed activity was establishing or improving lines of authority for use during wildfire incidents (95 percent), followed by identifying populations that are highly vulnerable to wildfire (92 percent), and completing hazardous fuels reduction projects (90 percent). On average, counties participated in 19 of the 34 possible actions.

The least common action reported by counties was establishing incentives for homeowners to retrofit their homes to reduce structural hazards. Only 6 percent of counties reported this action, and only 12 percent reported establishing a tax district to help fund planning, mitigation, or recovery actions. Fewer than half of counties reported establishing incentives for homeowners to create defensible spaces around residences (33 percent), enforcing requirements for posting resident addresses (38 percent), establishing enforcement mechanisms for codes and standards (40 percent), and establishing wildfire related zoning (42 percent).

These responses suggest a lack of consistent county-level engagement in actions centered on landowner preparedness and residential planning. Efforts to change landowner behavior have focused on education and awareness efforts rather than regulations or incentives to motivate change. In contrast, the most common activities included

Table 1 Wildfire action items performed or being performed in surveyed counties

Action item:	Percent of counties performing item:
Emergency response activities	
Established or improved lines of authority for use during wildfire incidents	95%
Upgraded technology for interagency communication	88%
Established or improved procedures for continuity of services during a wildfire	84%
Established or improved local emergency services capacity	67%
Established or improved local suppression capacity	63%
Administrative activities	
Implemented government coordination procedures for wildfire planning or emergency response (e.g. MOUs)	88%
Held or attended meetings of a wildfire planning committee	84%
Assigned a coordinator or committee for wildfire planning and mitigation	75%
Received grant funds for wildfire related education or mitigation activities	73%
Recruited volunteers for wildfire planning	68%
Awareness and education activities	
Distributed print information on wildfire risk, mitigation, and/or evacuation procedures	88%
Hosted a workshop that covered wildfire risk and/or wildfire risk mitigation strategies	87%
Created a local fire-safe council or other community-wildfire education organization	76%
Hosted a workshop that covered proper evacuation strategies	61%
Conducted wildfire related emergency management drills	56%
Hosted a workshop that covered alternatives to evacuation (e.g., stay & defend, shelter in place)	54%
Planning and preparation activities	
Identified populations that are highly vulnerable to wildfire	92%
Updated the original CWPP draft based on new information or resources	78%
Posted fire danger rating signage	74%
Established fuel reduction standards for areas of high wildfire risk	58%
Established wildfire evacuation routes	55%
Established wildfire-related building codes or design standards	55%
Established wildfire related subdivision codes	54%
Established wildfire related zoning	42%
Established enforcement mechanisms for codes and standards (e.g., fire suppression cost recovery if codes/ standards not met, final plat approval dependent on design standards, fines for not meeting standards)	40%
Established a taxing district to help fund planning, mitigation, or recovery actions	12%
Mitigation activities	
Completed hazardous fuels reduction projects (e.g., fuel breaks, thinning, etc.)	90%
Completed road improvements to assure emergency vehicle access	62%
Improved placement of strategic fire suppression resources (e.g., engines, pumpers, tools)	62%
Conducted prescribed burning	61%
Improved evacuation ingress and egress	60%
Enforced requirements for posting resident addresses	38%
Established incentives for homeowners to create defensible space around residences	33%
Established incentives for homeowners to retrofit their homes to reduce structural hazards	6%

wildfire planning, outreach, and mitigation that do not depend on homeowner participation. It appears that there has been greater success in implementing actions at the level of county government, and many opportunities remain for increasing fire adaptation through efforts that guide future development and landowner activities.

CWPP effectiveness

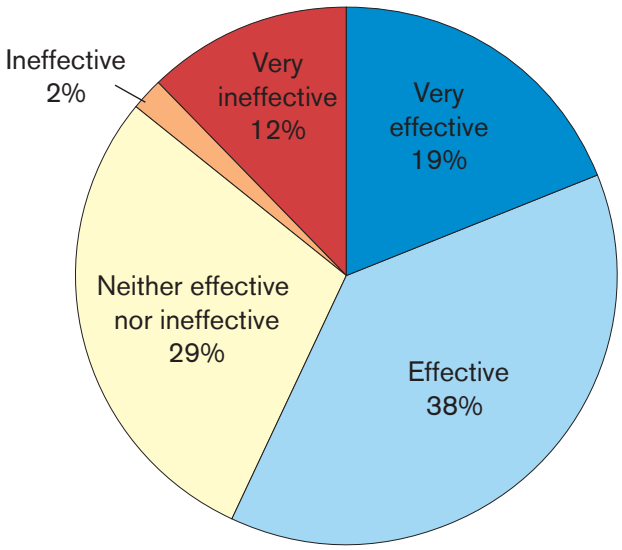
Community Wildfire Protection Plans and related processes have been effective in many but not all counties.

Since the passage of the Healthy Forests Restoration Act (HFRA), many counties, communities, and other jurisdictions across the West have completed CWPPs to define the WUI and prioritize wildfire-related actions. All surveyed counties were represented by an active CWPP. We asked county respondents how effective the CWPP and related processes had been at changing local preparedness and response to wildfire in their county.

The majority of respondents (57%) reported that their CWPP had been effective or very effective at changing local preparedness and response to wildfire, as opposed to 14 percent that reported that their CWPP had been ineffective or very ineffective (see Figure 2, below). However, 29 percent of respondents reported that their local CWPP had been neither effective nor ineffective, suggesting that while CWPPs appear to have accomplished some goals in many of the counties we surveyed, they failed to contribute to fire adaptation in a substantial number of places.

This may reflect the fact that CWPPs remain a relatively new tool, and that additional iterations or more time for implementation could be necessary to improve effectiveness in some places. It may also reflect differences in the planning processes used during the creation of the local CWPP, for instance the level of community engagement and information sharing that was utilized in the planning process. There is also the possibility that CWPPs are simply not as effective in some places as they are in others.

Figure 2 County respondent evaluation of CWPP effectiveness



Ten-year trends in preparedness, response, and recovery

Respondents perceived community wildfire preparedness, response, and recovery as generally improving, with the most room for improvement in recovery efforts.

The extent of wildfire damage in communities can be influenced by the degree of local preparation before the fire, response to the wildfire during the incident, and recovery actions taken after the fire. We asked county respondents to evaluate trends in the way that local communities within their counties have prepared for, responded to, and recovered from wildfire threats over the previous ten years. For eight of the nine specific efforts we asked about, the majority of respondents reported improvement; for "local resident recovery from fire impacts", the majority of respondents reported neither improving nor worsening conditions (see Figure 3, page 9). Very few respondents (between zero and five percent, depending on the effort) reported worsening trends for any of the specified efforts, suggesting that, overall, respondents felt that community preparation, response, and recovery efforts were heading in largely positive directions.

Although these responses suggest general improvement for communities over the previous ten years, there was the least amount of agreement around the quality of post-fire recovery efforts. When considered together (see Figure 4, page 9), 56 percent of respondents indicated improvement in wildfire recovery versus 87 percent for improvement in wildfire preparation and 81 percent for improvement in wildfire response. The reason for less agreement around improvement in recovery efforts is unclear. Our sample of respondents included only counties that had experienced a large wildfire between 2004-2012, presumably allowing for adequate evaluation of recent wildfire recovery efforts in addition to preparation and response efforts. Communities may have prioritized preparation and response over recovery efforts in recent years, or they may lack the strategies and support necessary to improve recovery from wildfire events. Regardless, the results suggest that, as a whole, wildfire recovery efforts have the most room for improvement and that future wildfire planning efforts may need to place greater emphasis on specific actions that improve wildfire recovery to match improvements reported in wildfire preparation and response trends.

Figure 3 County respondent evaluation of specific ten-year trends in preparation, response, and recovery efforts

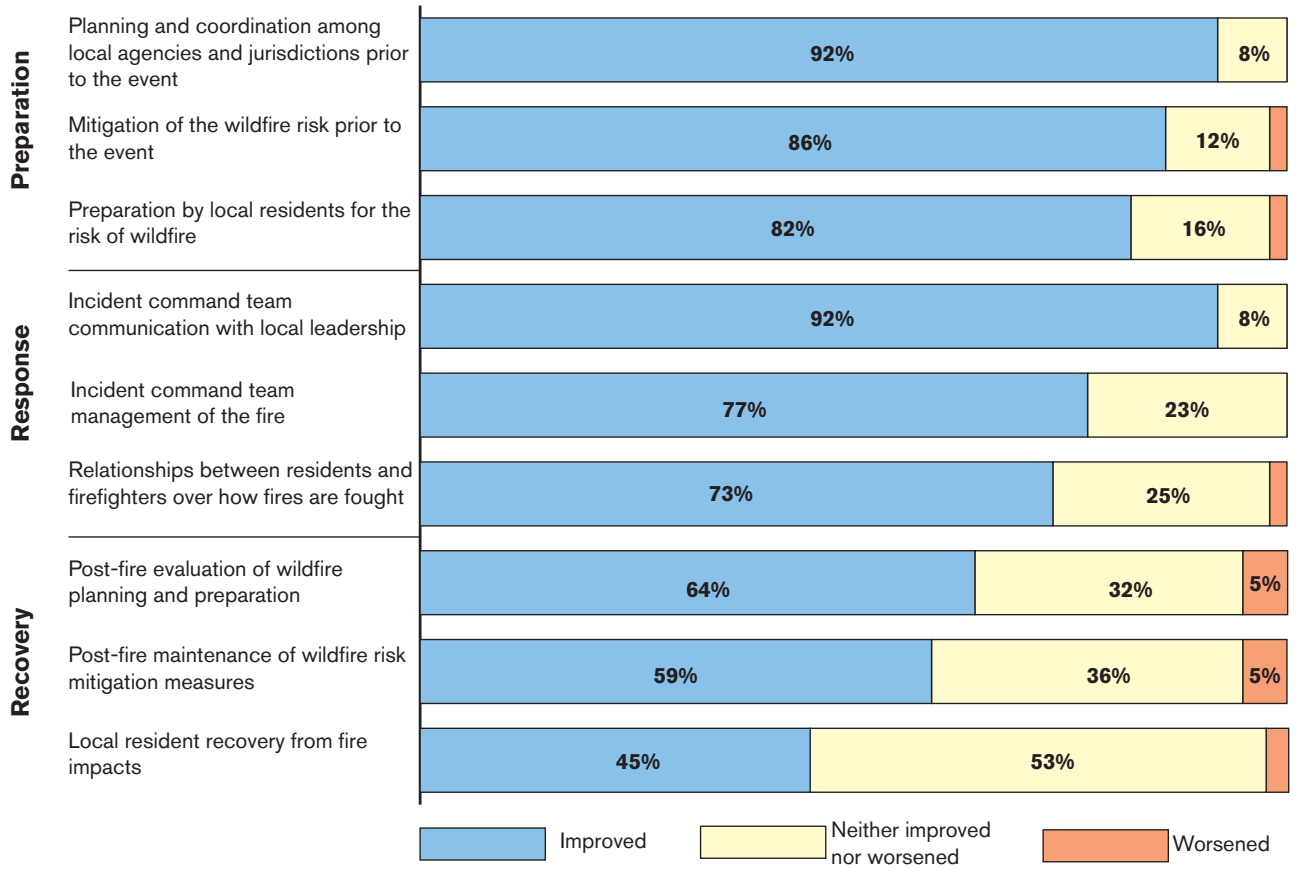
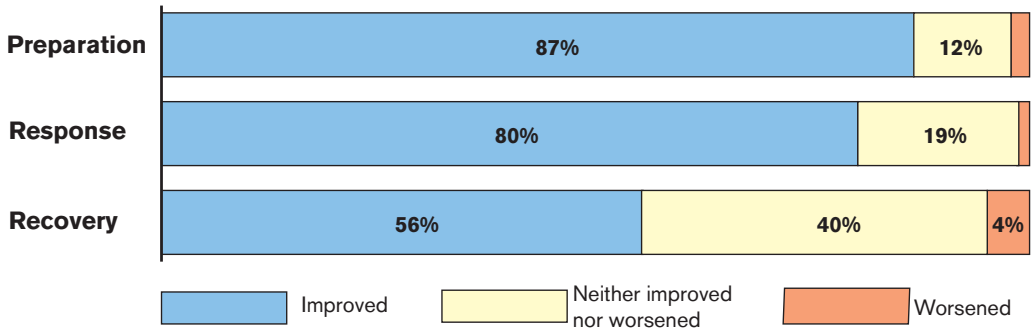


Figure 4 County respondent evaluation of ten-year trends in preparation, response, and recovery efforts overall



Results: Community surveys

Community respondents

Community respondents were recommended by county respondents as very knowledgeable about local wildfire planning, response, and recovery for a particular large wildfire that affected their community between 2004 and 2012. Respondents played a variety of roles in their communities, ranging from volunteer firefighters to fire chiefs and wildfire-related nonprofit organization employees. A majority (65 percent) of community respondents we surveyed had participated in the creation of the applicable Community Wildfire Protection Plan. When asked about their primary roles with respect to wildfire, 67 percent reported emergency management or response as a primary role, 58 percent reported community organizing/homeowner outreach, 54 percent noted planning, 49 percent noted disaster preparedness, and 39 percent noted fuels management. All respondents lived in the affected community at the time of the wildfire.

Wildfire impacts

Communities experienced a diverse range of impacts from wildfires that often persisted long after suppression was complete.

Wildfires can have substantial, diverse, and long-lasting impacts on the communities they affect. To understand the most common impacts of wildfires in the communities that we surveyed, we asked community respondents whether their community experienced various impacts ranging from reduced air quality to loss of property, infrastructure, and human life. Reduced air quality was the most widespread impact experienced, reported by 85 percent of respondents, followed by evacuation impacts, property and infrastructure damage or loss, home damage or loss, and loss of human life (see Figure 5, below).

Figure 5 Community respondent report of wildfire impacts on their community

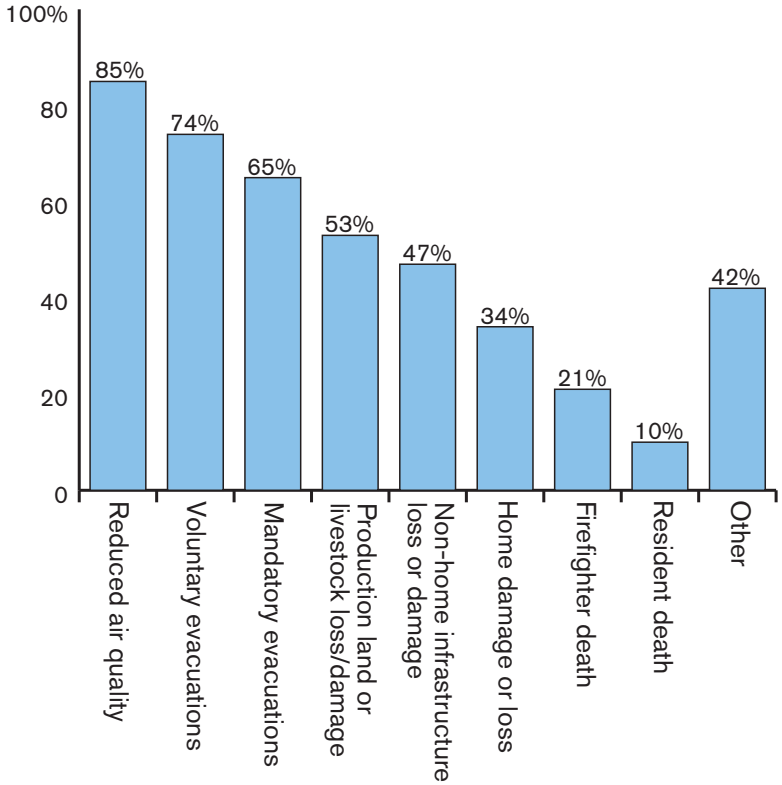
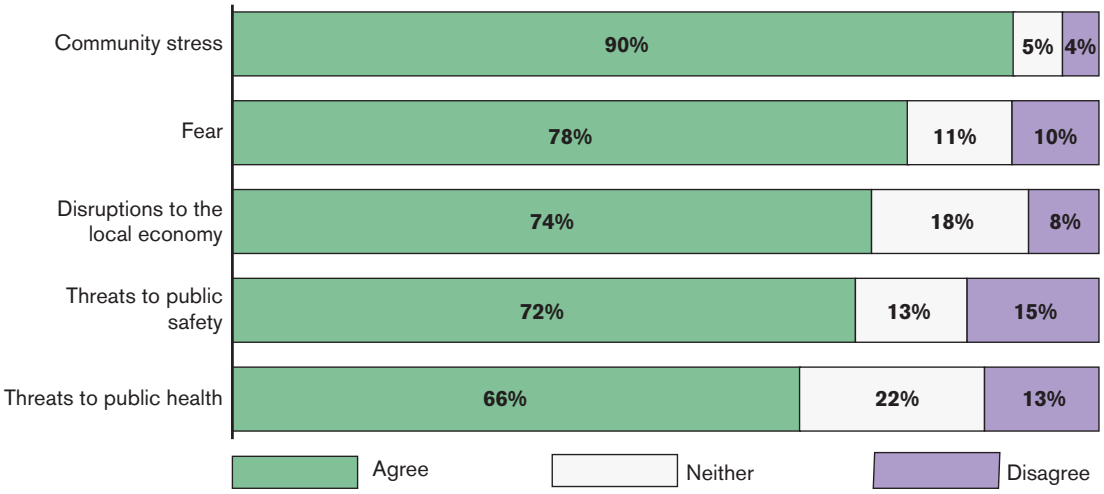


Figure 6 Community respondent level of agreement on less measurable wildfire impacts



In many cases, wildfires also have impacts that are more difficult to measure and account for. We asked community respondents if they agreed that their community had experienced impacts such as stress, fear, economic disruptions, and threats to public safety and health. A large majority of respondents agreed that their community experienced these impacts during the wildfire, with 90 percent agreeing that their community experienced stress resulted from the wildfire experience, and more than 70 percent for each impact agreeing that their community experienced fear, threats to public safety, and threats to public health (see Figure 6, above). One respondent elaborated that a fair amount of stress was put on the community as the fire's progression varied in direction and speed from day to day, while others detailed damages to local water systems, and threats to water supplies.

It is also important to consider the long-term results of wildfires. We asked respondents to indicate if there were impacts beyond the ones we asked about; in total, 49 respondents (42 percent) indicated "other" impacts (see Figure 5, page 10). The most common category of "other" impacts volunteered by community respondents was natural disaster impacts after the wildfire was fully suppressed, encompassing issues such as post-fire erosion, flooding, mudslides, and debris flows. As one survey respondent explained: "There were no impacts from the fire on homes, lives or infrastructure. All the impacts resulted from post-fire flooding. A life was lost and [there was] over $100 million in impacts." Multiple respondents elaborated on environmental impacts such as: watershed destruction; loss of wildlife habitat; increased invasive species activity; and compromised water quality that continued to persist many years after the wildfire. Many also described short- and long-term economic detriments, such as lost tourism dollars, reduced recreation opportunities and associated economic activity, significant losses of commerce due to highway closures and smoke, reduced property values, and lost livelihoods following damage to range and timber lands.

Altogether, community respondents reported and elaborated on a wide range of physical, psychological, economic, and environmental impacts as a result of the wildfires we asked them about. Although we focused on one specific wildfire event in each survey, 84 percent of community respondents reported that their community had been affected by more than one wildfire within the previous ten years, and 56 percent of respondents reported three or more wildfires, suggesting that, for many of these communities, wildfire impacts represent regular and cumulative experiences over time.

Effectiveness of efforts and areas for improvment

Effectiveness of efforts

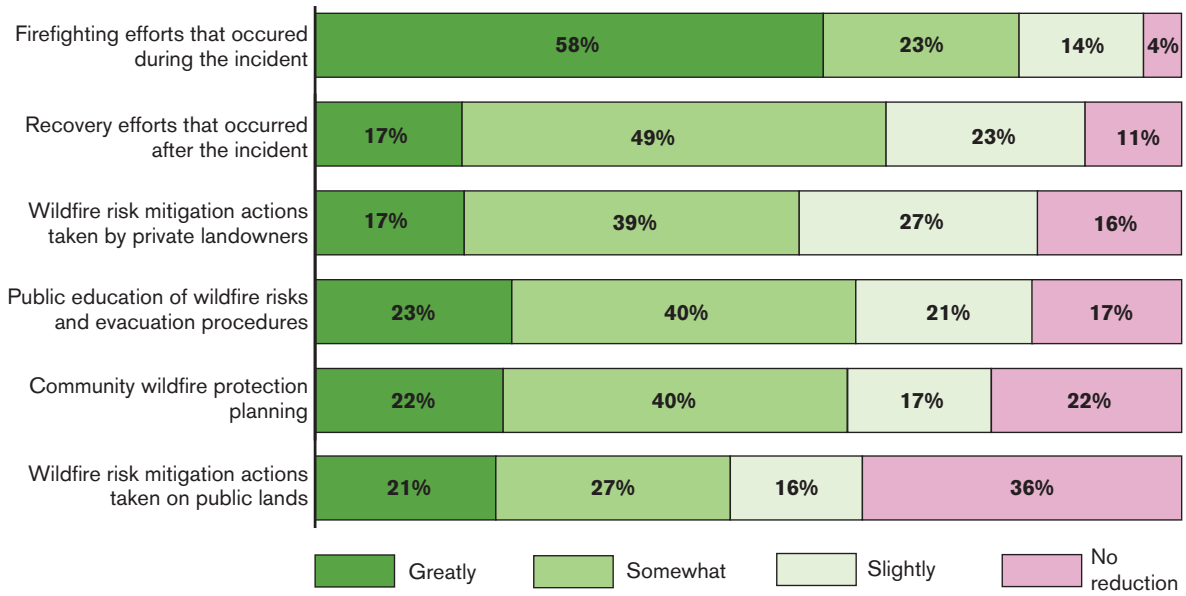
Respondents reported some effectiveness for all efforts in reducing wildfire damage; firefighting efforts had the highest perceived level of effectiveness.

Given the long duration of impacts from wildfire events, reducing the physical, economic, environmental, and social damages caused by wildfires is a key concern for communities affected by large wildfires. Federal efforts describe fire-adapted communities as capable of enduring, quickly recovering from, and learning from wildfires that might otherwise cause long-term negative consequences.[6] In communities that frequently experience wildfire events, reducing damage from wildfire is akin to increasing wildfire resilience. We asked community respondents how effective certain efforts were in reducing damage from the specific wildfire threat investigated in each survey.

Respondents suggested that the most important contributor to reduced wildfire damage was action taken by firefighters during the incident, with 96% of respondents indicating that these efforts reduced damages from the wildfires at least slightly (see Figure 7, below). Respondents reported that wildfire risk mitigation actions on public lands did the least to reduce wildfire damages; while 64 percent of respondents reported these actions reduced damage at least slightly, 36 percent suggested that they had no beneficial effect. It is important to remember that these results are not correlated with the level of public land or public land mitigation work near the wildfire area, thus it may well be the case that little public lands risk mitigation had been performed prior to the wildfire events we asked about, leading to lower perceived effectiveness in reducing damages. This is distinct from the perception that public land mitigation work is in and of itself ineffective.

Community wildfire protection planning had the second lowest reported effectiveness across surveys: 78 percent of respondents suggested that

Figure 7 Community respondent evaluation of how effectively efforts reduced wildfire damage



it had some effect, but only 22 percent believed that it greatly reduced damages. An equal proportion believed that it had no effect in reducing wildfire damage. Again, our survey does not determine a cause for these ratings; CWPP planning processes can vary greatly between communities, potentially providing different values and effectiveness to different communities. Presented another way, it is evident that all of the efforts we asked about had some level of success in reducing damages in the majority of the wildfires in question, and thus could be considered generally worthy efforts to invest in and pursue for reducing wildfire impacts.

Room for improvement

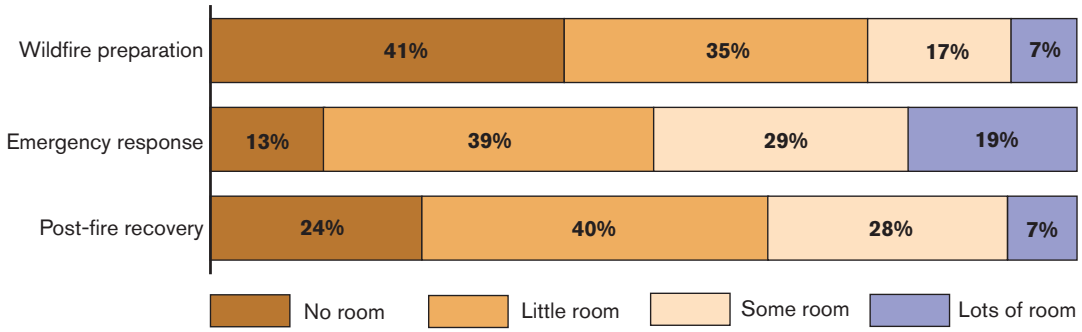
Community respondents perceived more room for improvement in wildfire preparation relative to emergency response and post-fire recovery actions.

Identifying the areas that are most in need of improvement can help target investments of time and resources to improve preparedness and community resilience. We asked community respondents how much room for improvement there could have been in wildfire preparation, emergency response, and post-fire recovery. Respondents rated emergency response the most favorably, with 19 percent of respondents reporting no room for improvement, and just 13 percent suggesting that there was a lot of room for improvement (see Figure 8, below). For post-fire recovery, 93 percent of respondents reported room of improvement, but only 24 percent reported that there was a lot of room. Respondents reported the most room for improvement in wildfire preparation. 93 percent reported that there was room for improvement in wildfire preparation before the wildfire occurred, with more than 40 percent reporting a lot of room for improvement, and just seven percent reporting no room for improvement.

The responses suggest that, although there was room for improvement in all efforts regardless of when they occurred in relation to the fire, the greatest opportunity for improvement in these communities was in preparation actions that could have happened prior to the wildfire. Future investigations might examine the particular efforts that are needed, and whether improved wildfire preparation requires expansion into more diverse efforts, or expanding the reach and acceptance of existing efforts. Respondents were the least critical of emergency response efforts, perhaps because they perceived wildfire actions taken by firefighters during the event as having the largest effect on reducing damages (See Figure 7, page 12).

Responses to a question on resource sufficiency paralleled the finding that respondents were most satisfied with emergency response effectiveness in their communities. We asked respondents how much they agreed that their community had: 1) sufficient resources to manage wildfire fire; 2) local firefighters well-trained for wildland fire; and 3) local firefighters well-trained for structural fire. While the majority of respondents did not agree

Figure 8 Community respondent evaluation of room for improvement in efforts to reduce wildfire damage



that their community had sufficient resources to manage wildfire risk, a large majority agreed that they had local firefighters that were well-trained for both wildland and structural fire (see Figure 9, below).

Taken together, the responses to questions on effectiveness of efforts, room for improvement, and resource availability indicate that communities are generally satisfied with emergency response firefighter resources, efforts, and effectiveness. They also suggest that the least effective efforts in reducing damages, and the most room for improvement, are in efforts that prepare the local community for wildfires. Because most respondents believed that they did not have adequate resources to manage wildfire risk, any additional resources that were invested in wildfire preparation might lead to improved effectiveness of these efforts and reduce the gap between the perceived effectiveness of emergency response versus preparation activities. Based on the responses from our community surveys, additional investments for fire adaptation would have the most potential for improvement if they focused on more robust, extensive, or diverse wildfire preparation efforts.

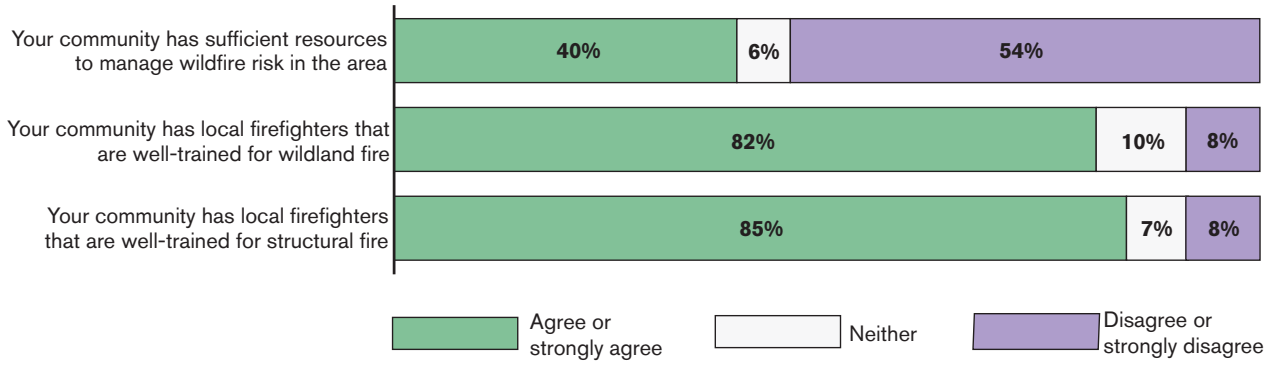
Ten-year trends in preparedness, response, and recovery

Community respondents reported improvement in all areas of wildfire preparedness, response, and recovery. Community respondents evaluated trends more positively that county respondents, but all respondents agreed on areas with the most and least improvement.

We were interested in understanding how respondents perceived trends around wildfire preparedness in their communities. Similar to county respondents, we asked comunity respondents to evaluate trends in the way that their community had prepared for, responded to, and recovered from wildfire threats over the previous ten years. In contrast to the other questions we asked community respondents, this question was not in relation to a specified fire, but instead probed overall trends for efforts and wildfires that affected their community.

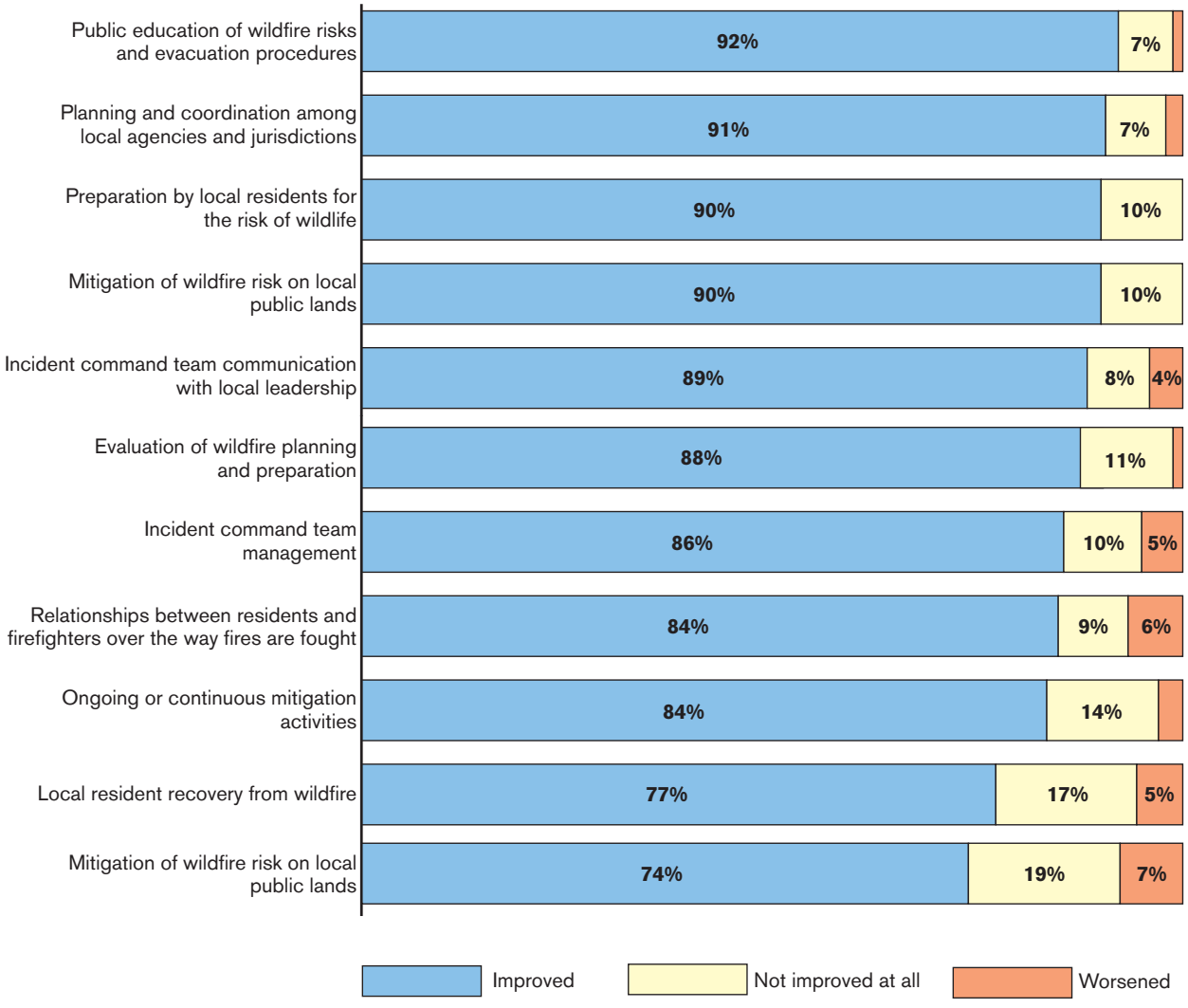
Community respondents had a largely positive view of ten-year trends in each of the eleven efforts we asked about. A large majority (between 74 and 91 percent) of respondents reported improvement in each area (see Figure 10, page 15). Respondents rated planning and coordination among local

Figure 9 Community respondent level of agreement on sufficiency of resources



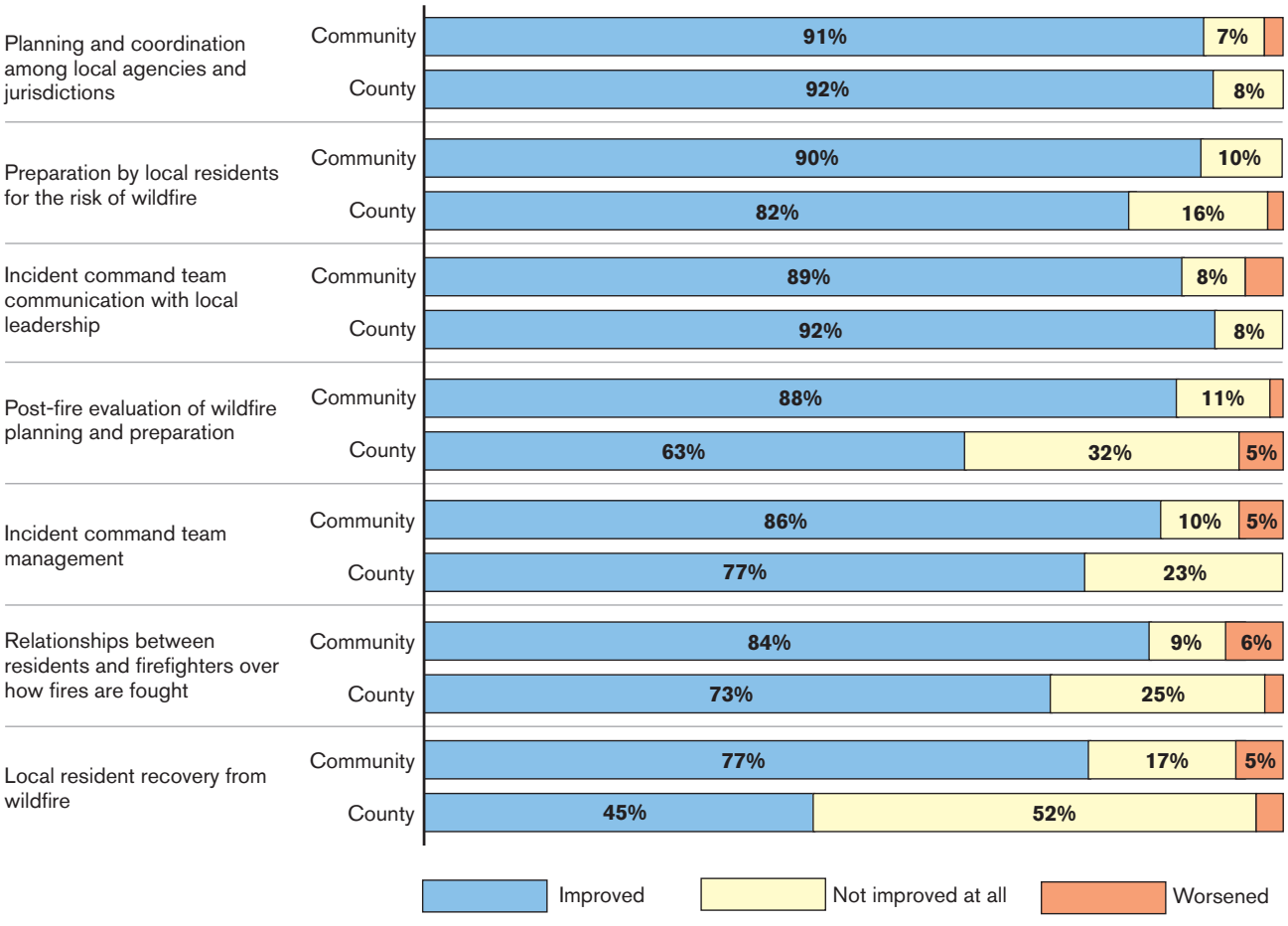
agencies and jurisdictions as the most improved, with 62 percent specifying that it was "greatly improved." Public education of wildfire risks and evacuation procedures was most consistently rated as at least somewhat improved (37 percent "greatly improved", 55 percent "somewhat improved"). For "preparation by local residents for wildfire" and "mitigation of wildfire risk on private lands", no respondents reported worsening trends, while 90 percent reported improvement. Efforts with the least reported level of improvement were mitigation of wildfire risk on public lands and local resident recovery from wildfires, for which 26 percent and 22 percent of respondents, respectively, reported unimproved or worsening conditions. These efforts also had the fewest respondents reporting "great improvement", although a majority of respondents still reported some improvement.

Figure 10 Community respondent evaluation of ten-year trends



Seven questions were asked of both county and community respondents in order to compare the evaluation of trends at both scales. In each evaluation, community respondents rated trends more positively than county respondents (see Figure 11, below). Both sets of respondents rated planning and coordination among local agencies and jurisdictions as the most improved effort over the past ten years. Respondents at both levels also rated local resident recovery from wildfire as having the lowest level of reported improvement. This suggests that, although community respondents evaluated all trends over the prior decade as more improved in their communities than county-level respondents rated them for communities across the county, there was general agreement about the efforts that have improved the most and those that have the most room for improvement.

Figure 11 Comparison of community and county respondent evaluations of ten-year trends



Summary and conclusions

Given the increasing incidence of large wildfires affecting communities in a growing wildland-urban interface, and ongoing efforts to protect communities, an understanding of how local communities perceive and evaluate their own preparedness is important. These surveys of county officials and community leaders in locations recently affected by large wildfires help illuminate how local leaders in wildfire planning and preparation view local efforts to prepare for, respond to, and recover from wildfire events.

County survey results showed that wildfire preparedness actions in the surveyed counties had focused more on implementing actions at the county government level than on residential planning efforts that depend on landowner participation. They also suggest that CWPPs and related processes are generally effective in most but not all of the surveyed counties. Finally, county survey results indicate that, overall, respondents saw trends in preparedness, response, and recovery around wildfire as improving over the last decade, with the most room for improvement in post-fire recovery efforts.

The community surveys portrayed a better understanding of the diverse impacts that wildfires can have on communities, including long-term impacts and impacts that are harder to measure and account for such as stress, fear, and threats to public health and safety. Community respondents reported that all the efforts we asked about had some level of success in reducing wildfire damages across the communities, but they felt that response actions, particularly those taken by firefighters during the incident, had the most effect. Most respondents still reported room for improvement in all efforts, with the most room reported in wildfire preparation. When evaluating ten-year trends, community respondents reported widespread improvement in all areas of preparedness, response, and recovery. They rated all trends more positively than county respondents did, but both sets of respondents agreed that planning and coordination among local agencies and jurisdictions had improved the most, and that local resident recovery had improved the least.

The results show that while respondents to both surveys agreed that there was still room for improvement, efforts to improve wildfire preparation, response, and recovery had all improved over the previous decade. They suggest that considerable progress has been made in certain areas and for certain types of preparation activities, but they also highlight areas, such as residential landowner efforts, where opportunities remain for increasing fire adaptation. These findings can help inform future research, policy, and practice to be more responsive to local perceptions about wildfire planning actions, effectiveness, and opportunities. For those involved in wildfire preparation and planning, these findings help illuminate the perceived effectiveness of efforts in other similar wildfire-affected communities across the West.

Endnotes

1 Fire Adapted Communities Coalition. 2013. "Guide to Fire Adapted Communities." Available at: http://www.fireadapted.org. Last accessed: August 26th, 2014.

2 D. Ganz, A. Troy, and D. Saah. 2007. "Community involvement in wildfire hazard mitigation and management: community based fire management, fire safe councils and community wildfire protection plans," in Living on the Edge: Institutional and Management Perspectives on Wildfire Hazard in the Urban Interface, A. Troy and R. G. Kennedy, Eds., pp. 143–164, JAI Press, Oxford, UK.

3 Williams, D.R., P.J. Jakes, S. Burns, A.S. Cheng, K.C. Nelson, V. Sturtevant, R.F. Brummel, E. Staychock, and S.G. Souter. 2012. "Community Wildfire Protection Planning: The Importance of Framing, Scale, and Building Sustainable Capacity." Journal of Forestry 110 (8): 415-420.

4 Abrams, J., M. Nielsen-Pincus, T. Paveglio, and C. Moseley. 2015. "Community Wildfire Protection Planning in the American West: Homogeneity within Diversity?" Journal of Environmental Planning and Management, DOI: 10.1080/09640568.2015.1030498 www.nrs.fs.fed.us/pubs/gtr/gtr_nrs89.pdf.

5 Jakes, P., and V. Sturtevant. 2013. "Trial by Fire: Community Wildfire Protection Plans Put to the Test." International Journal of Wildland Fire 22 (8): 1134-1143.

6 Fire Adapted Communities Coalition. 2013. "Guide to fire adapted communities." Available at: http://www.fireadapted.org. Last accessed: August 26th, 2014.

UNIVERSITY OF OREGON