A Research Paper by

HEADWATERS ECONOMICS

Local Responses to Wildfire Risks and Costs:

Case Studies and Lessons Learned

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ABOUT HEADWATERS ECONOMICS

Headwaters Economics is an independent, nonprofit research group whose mission is to improve community development and land management decisions in the West.

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Cover photo: Christian Science Monitor, 2012. Wildfire nears a house outside Cle Elum, Washington.

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I. SUMMARY

Headwaters Economics has done extensive research on the costs of wildland fires in the West, especially on the relationship between residential development in the Wildland-Urban Interface (WUI) and escalating expenses from protecting lives and property.[1] The case studies and conclusions in this paper seek to better understand whether the changing realities of wildfire—overgrown forests, longer fire seasons and drier weather—are altering the way communities confront wildfire risk.

We especially are interested in studying how western communities are responding to both the growing need to protect existing structures from wildfires, and also whether or how these communities are addressing the potential of increased costs and risks that would occur from residential growth on the average 84 percent of WUI land in counties across the West that currently is undeveloped.[2] Are communities employing local zoning ordinances, building codes, setback requirements, or other approaches to reduce wildfire costs? Our goal is to understand how communities currently are addressing wildfire risk, how they have responded to recent major fires, and to extract useful lessons and public policy insights for the future.

This report is based on eight case studies of cities and counties throughout the western United States. We chose communities that reflect the geographic diversity of the West and a mix of rural and more densely populated areas. These communities all have had a significant amount of residential growth in the WUI and are at high risk from wildfires. In addition, all have experienced a relatively recent large fire that would potentially spur them to act on reducing wildfire risks. We included communities that we had heard were actively implementing solutions to wildfire risk as well as those that were simply staying the course—because of lack of resources, lack of political will, or any number of other reasons—even after experiencing severe fires.

While not an exhaustive list, we believe the communities studied are representative of typical jurisdictions and their responses to wildfire threats across the West. The case studies do highlight that most western communities are doing little to respond to dangers from future wildfires compared to what they need to do. If the growing wildfire dangers are not addressed locally, policy-makers face two options. On the one hand, more tragedies may force action. On the other, the federal government, along with states to a lesser extent, may step in to address the risks to lives and property. Such activities could come in the form of incentives—such as education, financial or planning assistance, and risk mapping—or through placing more burdens on communities, such as shifting a larger share of fire-related responsibilities and costs to the local level.

[1] See "Summary: Wildfire Costs, New Development, and Rising Temperatures." http://headwaterseconomics.org/wildfire/fire-research-summary.

[2] See "As Wildland Urban Interface Develops, Firefighting Costs Will Soar." http://headwaterseconomics.org/interactive/wui-development-and-wildfire-costs.

II. INTRODUCTION

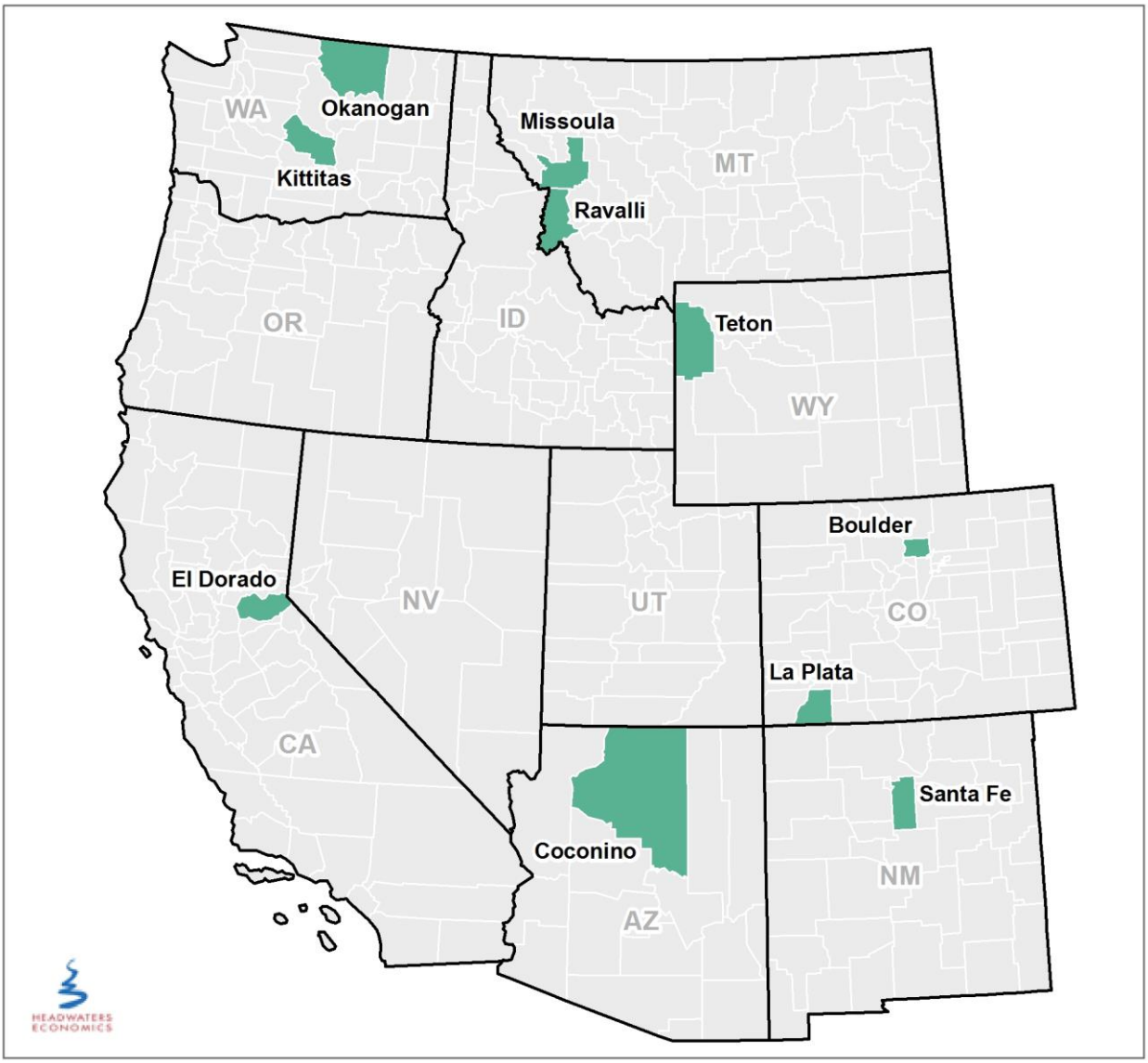
Wildfires in the West are growing in size, length, and destructiveness, greatly increasing the risks to lives and property as well as the costs of suppression and recovery. Six of the worst fire seasons since 1960 have occurred since 2000, and the loss of lives also has increased, as evidenced by the 2013 Yarnell fire in Arizona. Bigger wildfires are generally the result of two factors. First, the amount of biomass fuels has risen, due to historic management practices—such as logging of large pines, which led to a less fire-tolerant understory—and aggressive fire suppression, which eliminated the natural, low-intensity fires that reduced biomass levels. Second, changing climatic conditions—higher temperatures, widespread drought, earlier snowmelt and spring growth, and expanded insect and disease infestations—have made forests more susceptible to fire.

A third factor drives up fire risk as well as fire costs: home development in the Wildland-Urban Interface (WUI)—areas of private homes near fire-prone public lands. Residential development plays a significant role in increasing the risk of western forest fires. The cost of protecting development from fire significantly raises the cost of fire suppression, which can only be expected to increase with continued development. Today, only about 16 percent of the WUI in the West is developed, with the remaining 84 percent available for development. Residential growth on these lands is primarily a local responsibility, but state and federal governments now bear the cost of wildfire protection.

To date, fire protection efforts in WUI areas have focused largely on reducing fuels and making structures safer from fires through education and Firewise-type programs. While these activities are necessary, they are not sufficient to control the rising cost of protecting public safety and structures in the WUI from wildfires. Successful cost and risk control only can occur when future development is limited or redirected away from the most fire-prone areas.[3]

[3] Headwaters Economics recently conducted two studies, one quantitative the other qualitative, to better understand the effects of Firewiseon wildfire suppression costs, both soon can be found at http://headwaterseconomics.org/wildfire/firewise.

Location of Eight Case Studies



Eight Local Case Studies & Lessons Learned

1. Boulder County, Colorado
2. La Plata County, Colorado
3. City of Flagstaff, Arizona
4. El Dorado County, California
5. Kittitas & Okanogan counties, Washington
6. Missoula & Ravalli counties, Montana
7. City of Jackson, Wyoming
8. City of Santa Fe, New Mexico

III. METHODS

Headwaters Economics conducted interviews with people in city and county government—including fire marshals and fire chiefs, employees in Offices of Emergency Management, wildland fire specialists, and county planners—who are closely involved in fire prevention and/or firefighting. We asked them:

1. What are the wildfire risks and costs facing the city or county?
2. How would you characterize the sense of urgency in terms of cost, danger, risk, etc.?
3. How much worse will the problem of wildfire become?
4. What is the city or county's policy toward the wildfire issue and WUI development?
5. How was current policy enacted (if applicable)?
6. What funding and resources are available to enact policy or respond to fires?
7. Has the city or county tried any planning techniques to reduce fire risk?
8. What would happen if federal support for firefighting costs were to end and your local jurisdiction became responsible for all firefighting costs?

While our interviews were not exhaustive, they uncovered the main course of action that each community has undertaken and the obstacles they face implementing policies that address wildfire risk. Given the severity of the wildfire problem, our interest centered on whether any community is addressing this issue with an appropriately rigorous solution.

Headwaters Economics supplemented the insights from the interviews with information from Community Wildfire Protection Plans, County Comprehensive Plans, and other documentation. We then summarized key lessons learned from each case study. We welcome addendums and clarifications, as most parties are still exploring possible solutions.

IV. BACKGROUND

The Rising Costs of Wildfire Protection

The following background summary on rising costs and potential solutions is taken largely from a longer report, *The Rising Cost of Wildfire Protection*, written for Headwaters Economics in 2013 by Ross Gorte, Ph.D., a retired Senior Policy Analyst for the Congressional Research Service.[4]

Wildfires are getting bigger and causing more damage, largely as a result of an increase in biomass fuels, changing climatic conditions, and ongoing development in the WUI. Not surprisingly, wildfire protection costs have also risen substantially. In the 1990s, the average appropriations for federal wildfire protection and suppression were less than $1 billion annually. Since 2002, the cost of federal wildfire protection and suppression has averaged more than $3 billion per year. Wildfire protection now accounts for nearly half of the Forest Service annual budget and more than 10 percent of the budget for all Department of the Interior agencies.

These figures do not include the $1 to $2 billion spent by states on wildfire protection or an untold amount spent by local governments. In addition, the federal government, through the Federal Emergency Management Agency (FEMA) and other agencies, has paid substantial amounts for disaster recovery in the aftermath of the large wildfires that have occurred with increasing frequency over the past decade. Prior to 2000, FEMA had responded to 11 major or emergency wildfire disaster declarations, with two in the 1950s, three in the 1970s, three in the 1980s, and three in the 1990s.[5] From 2000 through 2012, FEMA responded to 19 major or emergency wildfire disaster declarations. FEMA's fire management assistance grants (FMAGs) averaged $20.4 million annually between 1991 and 1999, with more than half of the total being paid in 1998. FMAGs averaged $71.2 million annually between 2002 and 2011, more than triple the FEMA wildfire assistance in the 1990s.

This tripling of federal fire protection expenses is partly due to fuel buildup and climate change, but home development in and near forests and other wildlands that are at risk from wildfires—the Wildland-Urban Interface (WUI)—also plays a major role. While protecting the private lands in WUI areas is largely a state and local responsibility, WUI development also has increased state and local demand for direct federal financial assistance in wildfire suppression. Today, the federal government funds a significant share of overall wildland firefighting costs, even on private lands. An additional result of WUI development is that protection of private homes has taken precedence over other fuel reduction efforts for the Forest Service, shifting the focus of treatments from the fuels that have accumulated deeper in the forest to areas near homes.

The risk of wildfire and wildfire protection costs will likely rise as climate change intensifies and home development continues. Currently, the majority—84 percent—of the WUI in the West is undeveloped.[6]

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[4] Gorte, Ross. 2013. The Rising Cost of Wildfire Protection. Headwaters Economics. http://headwaterseconomics.org/wildfire/fire-cost-background. Gorte is now Affiliate Research Professor, Earth Systems Research Center of the Earth, Oceans, and Space Institute, University of New Hampshire.

[5] U.S. Dept. of Homeland Security, Federal Emergency Management Agency, http://www.fema.gov/disasters/grid/year?field_disaster_type_term_tid_1=6847&=GO.

[6] For a state-by-state and county-by-county list of developed WUI lands in the West, see: http://headwaterseconomics.org/interactive/wui-development-and-wildfire-costs We define the WUI as private land within 500 meters of forested federal land. Other definitions exist,

The development of these WUI areas would significantly increase the federal cost of wildfire protection, despite the fact that their protection is a state and local responsibility. Furthering the extent of danger from fires both to firefighters and residents is that more and more housing development is occurring in high risk areas—such as along steep slopes or in box canyons. Also, an increasing number of western communities are experiencing another fire-hazard; post event flooding exacerbated by the loss of ground cover from recent large or extensive fires.

The Federal Response to WUI Development

The West is the fastest growing region of the country, and many people in this region are moving into wooded, fire-prone areas. The fire chief in Okanogan County, Washington, for example, says that people who move to the county want to be "out there by themselves," so they build far from neighbors, do not cut down trees or take other measures to keep fire away from structures, and do not construct appropriate access roads. Many residents of rural counties are not only fleeing other people, but also often are fleeing regulations; they do not want to be told "how to live" (e.g., what they can do on their property) nor *where* they can live (e.g., if their wooded plot of land is deemed too high risk to build a home on).

Initially, this development pattern primarily posed a challenge in rural areas, but increasingly, home development in and around fire-prone lands has become characteristic of larger and denser subdivisions near major western cities. The Black Forest fire in 2013 just outside Colorado Springs set the Colorado record for homes lost from a forest fire (511) just one year after the Waldo Canyon fire destroyed 346 homes and burned just northwest of the same city.

In response to these growing risks, in 2003 Congress passed the Healthy Forests Restoration Act, which directed that half of federal fuel reduction funds be used in WUI areas. Focusing on fuel reduction on WUI lands, however, means that other lands receive fewer fuel reduction treatments. While fuel reduction near WUI areas is important, many experts, like Diane Vosick at the Ecological Restoration Institute (ERI) at Northern Arizona University, emphasize that treating WUI without treating the rest of the forest will lead to more severe wildfires in the future. As report published by ERI finds: "Proximity to the WUI and fire size are correlated with increases in suppression expenditures. A growing body of evidence demonstrates that WUI treatments are effective for reducing damage to communities. However, modeling shows that by failing to invest in treatments in the greater landscape, severe, landscape-scale fire will persist."[7]

In addition, the presence of nearby homes complicates conducting prescribed burns as fuel treatment or using back burns, which are more effective than mechanical treatments, to fight fires. Any wildfire presents a risk of suddenly changing direction and endangering lives and property—as happened during

including a broader definition of WUI consisting simply of land where homes are at risk from wildfire. An exact definition of WUI is less important than an acknowledgment that the vast majority of land where wildfire can pose a risk to property is not yet developed.

[7] Ecological Restoration Institute. 2013. The Efficacy of Hazardous Fuel Treatments: A Rapid Assessment of the Economic and Ecologic Consequences of Alternative Hazardous Fuel Treatments. Northern Arizona University. http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/D2013004.dir/doc .

the prescribed burn set in Bandelier National Monument in 2000 that eventually burned into Los Alamos, New Mexico.

At the same time that the wildfire challenge is increasing, federal and state funding in this area is becoming more restricted. The federal budget battles, sequester, and other financial stand-offs are decreasing the financial support available from the national government. The FLAME act—designed to shield Forest Service programs from being raided to pay for fire suppression—has had limited success in protecting the federal agency's resources. While Congress again approved supplemental assistance to pay for fire suppression, it is not clear whether such additional funding will continue year after year in the future. The restricted federal budget environment is on top of state budget reductions. One CALFIRE official said the state is "cutting off their nose to spite their face" by reducing California's fire prevention budget.

Other federal approaches to fire also may be changing. Historically, federal officials—whether the Forest Service, Bureau of Land Management, or Fish and Wildlife Service—have not taken an active role in attempting to influence land management decisions on private property adjacent to federal holdings, even though the federal government traditionally has been the primary funder of wildfire suppression activities (as well as often helping in rebuilding efforts through the Federal Emergency Management Agency). In the past, federal officials devoted their efforts toward protecting both public and private property when endangered by a wildfire.

Now, however, some of the National Forests near our case studies appear to be altering management practices. While no official policy has changed, staff at both the Bridger-Teton and the Bitterroot National Forests discussed the possibility that soon they may no longer be able to do the kind of structure protection that they have in the past.

The Local Response to WUI Development

The federal government's history of funding a large share of wildfire suppression costs has reduced the responsibility, authority, and incentive for local officials to act. In 2006, the U.S. Department of Agriculture's Office of Inspector General (OIG) found that the public will continue to expect the Forest Service to suppress most fires unless the financial burden is shifted away from the federal government: "Assigning financial responsibility to State and Local government for WUI wildfire protection is critical because Federal agencies do not have the power to regulate WUI development. Zoning and planning authority rests entirely with State and local governments."[8]

As the OIG report notes, local officials do have a variety of tools to protect communities from fires, but each also has problems and limitations. As discussed above, managing fires near residential development is much more complicated and expensive than doing so in wildlands. In addition, local fire prevention efforts often face legal hurdles that are likely to make firefighters and local governments more hesitant to employ fire as a prevention or suppression tool. For example, a recent Montana Supreme Court ruling upheld a $730,000 judgment against the Montana Department of Natural Resources and Conservation for a backfire set in a 2000 fire that was determined to have unnecessarily harmed a private ranch.

[8] U.S. Department of Agriculture. Office of Inspector General.2006. Audit Report: Forest Service Large Fire Suppression Costs. Report No. 08601-44-SF.

The Healthy Forests Restoration Act motivated communities to produce Community Wildfire Protection Plans (CWPPs). The goal of the act was to provide funding and guidance for better forest management practices in wildland and WUI areas. Communities with approved CWPPs were able to influence prioritization of funding for federal fuel reduction projects. Most fire safety measures that CWPPs focus on—education about fire safety, fuel reduction, access routes, building materials, and defensible space—are compatible with Firewise recommendations.

Some counties are approving regulatory standards for homes in fire-prone lands. Missoula and Ravalli in Montana, for example, have WUI standards for subdivisions. But for individual homes scattered throughout the forest, only El Dorado County, California and Boulder County, Colorado (among those we talked to) have construction and defensible space standards, though several Firewise programs, such as those in Flagstaff and La Plata County, encourage such mitigation techniques. Some counties, however, such as Okanogan, zone for lower density, in effect requiring dispersed homes that cost more per structure to protect.

Today, existing homes receive much more attention from local officials than the majority of the WUI in western U.S. that is not yet developed. Firewise is one of the few options to make existing homes safer and is by far the most common form of addressing wildfire risk. The national Firewise program dates back to 1986, when the Forest Service and Department of the Interior partnered with the National Fire Protection Association to create a national project to address fire risk in the WUI.[9]

Many of the communities we talked to have an active Firewise program. Their primary role is education and outreach, encouraging people to implement Firewise principles such as clearing brush, building materials, and redundant evacuation routes. Even implementing Firewise has been a major step requiring considerable effort for many places. Residents often do not fully understand what the program means (e.g., Firewise does not mean no trees or vegetation) or prefer an "in the woods" setting for their home. Flagstaff, as one example, has a Firewise program along with community education programs and a division of the fire department dedicated to wildland fire management.

Recent wildfires have shown that Firewise is not foolproof. Instead, Firewise should be seen as one tool as part of a larger policy and enactment menu required for future fire safety and reduced costs. [10] Fires are capricious, and behave very differently given the ecological conditions of the forest, weather, and other factors. A Firewise community that did not burn in one fire may still burn in the future. Unfortunately, some residents who conduct Firewise activities may assume that such a program makes them invulnerable to future fire risks.

In addition, Firewise may unintentionally increase fire risk by encouraging local officials, developers, and home owners to buy and develop property in high-risk fire areas, thus resulting in more rather than fewer homes that are vulnerable to future forest fires. As Colorado Springs resident Beverly Bailey told the *New York Times* about their efforts to implement Firewise recommendations before the 2013 Black

[9] See www.firewise.org and http://headwaterseconomics.org/wildfire/firewise.

[10] Headwaters Economics has written specifically on possible future solutions to controlling fire costs and reducing risk. http://headwaterseconomics.org/wildfire/fire-suppression-costs.

Forest Fire: "It made no difference whatsoever. They'd said that for a long time we were a disaster waiting to happen. I guess it finally caught up with us."[11]

Firewise and fuel treatment—to the extent they are now employed—may be mitigating risk for existing development near fire-prone lands. But these steps alone are not solving the problem of the increasing costs and risks of wildfire. Given that fire danger is expected to increase in the coming years, a number of policy analysts are proposing more ambitious or systemic ways to address wildfire risk to lives and homes, and costs to taxpayers.

Solutions are emerging from both the public and private sectors—such as a greater role for private insurance or reallocation of public funding. While wildfire is often seen as a local problem, one that can be solved by Firewise, zoning, or other measures, many localities lack the will to take even these steps, partly because the federal government bears the significant cost of fires suppression. Local communities often lack the incentive to enforce fire safety regulations or to restrict building in WUI areas.

Hence, in many communities, including those we studied, there are few efforts to attempt new or more extensive solutions. Even in communities that have experienced recent large fires, and in others that are seeing a growing number of homes in surrounding WUI areas, residents often resist more extensive approaches.

Flagstaff is the only community we talked to that has done a complete cost accounting of a recent major fire. The report, *A Full Cost Accounting of the 2010 Schultz Fire*, produced by the Ecological Restoration Institute (ERI) at Northern Arizona University, found that while the federal government picked up most of the cost of fire suppression, the local community suffered the economic (and other) costs of the aftermath of the fire, including severe flooding in the fire area.[12] The full cost accounting was a significant factor leading voters to pass a ballot measure funding fuel treatments in critical areas of the forest surrounding the city. Even then, the city has not restricted future development or directed it away from the most dangerous areas.

[11] New York Times. Toll of Homes Destroyed in Colorado Wildfire Rises to Hundreds, 2 Bodies Found. June 14, 2013. http://www.nytimes.com/2013/06/14/us/colorado-wildfire-destroys-hundreds-of-homes.html.

[12] Available at: http://nau.edu/ERI/Banner/Schulz-Fire/.

V. LESSONS LEARNED AND POLICY IMPLICATIONS

None of the communities we researched have implemented land use planning tools directly to reduce fire risks.

While not an exhaustive list, we believe that the eight communities Headwaters Economics surveyed are typical for jurisdictions in the West. The case studies—detailed later in this report—highlight several important trends, each deriving from this important perspective: until communities accept that wildfires are a large and growing risk, they are unlikely to provide sufficient resources to proactively and comprehensively address this issue.

First, while some communities across the West are taking limited steps to address fire risk, most communities need substantially more financial resources and expertise in order to address the growing wildfire risk.

Second, the fiscal reality for most cities and counties is that they are continuously strapped for funds—relying on volunteer fire departments or lacking the resources and staff to enact or enforce regulations. Many counties, like La Plata, are struggling to maintain their existing programs, so introducing further prevention or education efforts is beyond their current capacity.

Third, even with these additional assets most communities will face strong political headwinds that make it extremely difficult to implement and require new regulations or safe standards. None of the counties we researched, for example, have implemented land use planning tools to reduce fire risks.

To facilitate discussion of these issues, this section is broken into two parts. The first discusses lessons from the communities we surveyed concerning actions and tools they have employed to start to address risks to lives and property from fires. The second section turns to broader policy implications concerning what states and the federal government could do to mitigate future wildfire risks.

General Lessons and Potential Solutions

1. **Lack of local resources is a significant obstacle.**
   Many counties and towns have all-volunteer fire departments (except for a few paid positions). Limited staff curtails fire prevention and education efforts, monitoring compliance, and firefighting capacity. In at least three of the counties we talked to (Okanogan, Missoula, and Ravalli), the bulk of firefighters and fire personnel are volunteer. They emphasized the heavy burden this creates and the consequences on their ability to do initial fire prevention work and then sustain it over time.

   Limited financial resources also mean that many rural counties do not have a fire marshal. Okanogan and Kittitas counties demonstrate a clear contrast between comparable counties—one county with a fire marshal, who has been able to enact fire codes; and one county without an official, where little has been done to reduce wildfire risk.

2. **Lack of local political will may be as significant as lack of resources.**
   Often the anti-regulatory sentiments in a community are strong enough to impede enacting regulations or implementing basic enforcement actions such as hiring a fire marshal, even if the community has sufficient financial resources. Ravalli County, for example, is a relatively wealthy county, but is hesitant to enact regulations of any kind, not just WUI development. Even localities like Boulder, which have successfully enacted and enforced some regulations such as open space requirements, most often are reluctant to introduce the idea of land use planning as a solution to wildfire risk and costs.

3. **A high level of cooperation among government bodies is important.**
   Cooperative agreements between local, county, state and federal agencies create efficiencies and allow each to more clearly delineate their responsibilities and share information. Such coordination and cooperation translate into high levels of trust and long-standing relationships—like those in Kittitas, Jackson, and Missoula counties. This cooperation is critical to building political capital toward additional efforts or reforms.

4. **Education is essential to overcome denial and complacency.**
   Education about fire risk, fire behavior, and the limitations of firefighting can help counteract people's capacity to deny unpleasant information and to convince themselves that bad things only happen to other people. Often a fire close to home is what it takes to raise awareness and trigger action, but by then it may be too late. Education also is critical to counteract complacency. Under certain fire conditions, aggressive firefighting and good coordination may save lives and structures. But such successes can also lull communities into thinking that aggressive firefighting will always be able to save their homes, as Jackson's example illustrates.

5. **How wildfire risk is presented is critical to gaining support.**
   Politics, education, and experience all play a role in how communities receive information about wildfire risk and react to prevention strategies. In Missoula, for example, county officials are careful to focus on the importance of saving lives, rather than the need for regulations. In Flagstaff, science-based evidence about forest fire and forest health, as well as on-the-ground examples of fuel treatments, have been effective in helping residents understand wildfire risk.

6. **It is impossible to be continually "Firewise" or fire safe.**
   Being fire safe is important but it is not the same as being fire proof. Creating a buffer between forest and homes requires constant work and vigilance as the forest keeps growing. The study communities we studied struggled to maintain a true barrier between residences and forest fuels. The recent example of Colorado Springs, where many residents believed they were safe from fire, is instructive, and while several communities encourage Firewise activities, few require and enforce them.

7. **WUI development restricts forest management options.**
   The presence of homes near Forest Service lands restricts the way the Forest Service can manage the forest. More aggressive fuel treatment and fire suppression techniques—such as prescribed burns and large backburn areas—are risky when homes are nearby. They also involve more risk for firefighters and agencies, who can be blamed for a decision that does not play out well, such

as the recent Montana Supreme Court ruling that a state agency's backfire unnecessarily harmed a private ranch.

8. **Fuel treatments are critical, but implementing them in the WUI area is not enough.** To effectively reduce the severity of wildfires, fuel reduction must be done deeper in the forest as well as near development. While this is primarily the responsibility of the Forest Service, bond measures that support forest thinning, such as in Flagstaff, can help counteract funding deficiencies. In addition, reducing the need for Forest Service resources to protect WUI homes would also leave more resources for fuel treatment deeper in the forest.

Policy Implications

Because these local conditions are unlikely to change in the near future—meaning that wildfire dangers will not be addressed systemically in most communities—policy makers should look to reform federal and state policies to provide the incentives necessary for cities and counties to take action. The two broad policy reforms described below would work best in concert, making more resources and tools available to communities while also increasing accountability to communities.

1. **Federal assistance should be better targeted to reduce future fire costs and risks** To date, federal assistance to counties has been limited to fuels reduction and education, but much more could be done with land use planning, education, risk mapping, and other tools. Overall federal funding is likely to decrease in coming years, so for new policies to be effective they should focus on what is driving the growing risk and cost of wildfires and can be impacted in the near term—future building in the WUI.

2. **Cost responsibility must shift from the federal government to local jurisdictions** At the same time, the federal government should strongly consider increasing local cost responsibility for fire suppression. Too often, communities—despite rising risks—have opted to take no action despite the growing number of homes in the WUI, or even after recent nearby fires caused extensive home loss and costs.

   Shifting a higher portion of the costs related to the defense of homes onto local governments would place a greater burden on these communities, but may be necessary to create the incentive or political will for local leaders and officials to take action. This does not necessarily mean no building, but it may mean local governments reform how and where they approve future subdivisions. Local planning departments should be given the authority to pursue efforts such as requiring that new homes are built out of harm's way, or that residences must be clustered as part of subdivision approval. If communities are reluctant to pass strict regulations, other options—such as providing bonuses to developers—are available.

Potential Solutions

In its wildfire work, Headwaters Economics has developed a list of potential policy reforms that could be done administratively:

- **Improved Comprehensive Land Use Plans and Community Wildfire Protection Plans (CWPPs)**
- **Full Disclosure of Fire Risk for Potential Home Buyers**
- **Bill County Governments for Their Share of Firefighting Costs**
- **Shift Fire Suppression Responsibility More to the Local Level**
- **Redirect Federal Financial and Technical Aid to Improved Land Use Planning**
- **Buy Land and Development Rights**
- **Refuse to Risk Firefighter Safety by Not Defending Empty Structures**
- **Map Fire Risk**

In addition, new federal legislation could be developed, along the lines of other laws that address natural disasters A list of potential principles, some mentioned earlier, includes:

- **Identify Fire Risk Though Consistent and Updated Mapping**
- **Clarify Firefighter Safety Always Trumps Structure Protection**
- **Promote and Increase Federal Involvement in Land Use Planning**
- **Federal Assistance Should Be Based on Local Performance**
- **Involve Banking for Home Mortgages in High Fire Risk Areas**
- **Discourage Rebuilding in High Risk Areas or Require Conditions for New Building**
- **Require Full Disclosure of Risk for Potential Home and Land Buyers**
- **All Programs Distributing Federal Funding for Conservation (e.g. LWCF) Require Consideration of Reducing Fire Risk in the WUI.**

VI. CONCLUSION

It will be difficult to control the rising costs, damages, and dangers related to home development in the WUI unless there are negative financial consequences for private land management decisions that increase risk and direct positive financial rewards for decisions that reduce risk.

Wildfires already create huge risks to lives, property, and taxpayers. The risks will intensify in coming years as the combination of climate change, stressed forests, and development in the Wildland-Urban Interface lead to more severe fires, longer fire seasons, and more homes in harm's way.

Local communities have clear indications that they should be responding aggressively to the mounting concern about forest fires. Two reasons especially stand out: first, fires will harm a growing number of their citizens and property. Second, the existing federal policy of paying for a significant share of the costs of fire suppression will not continue indefinitely.

> *"We should hope for rain and moisture."*—Fire protection official on local wildfire policy
>
> *"My house is an absolute fire trap."*— A local fire chief acknowledging he lives in a "nightmare" home, from a fire safety perspective

Today, most communities are not responding in significant ways to fire risk. The task is not simple, as cities and counties face difficult realities and the facts on the ground are changing faster than public understanding, or political will to reform current policies. Our case studies, however, show that cities and counties are doing little to lessen existing fire dangers, let alone to prevent the growth of more homes in fire-prone areas. Some have taken more steps than others, but all are struggling to implement basic fire safety policies.

It will be difficult to control the rising costs, damages, and dangers related to home development in the WUI unless there are negative financial consequences for private land management decisions that increase risk and direct positive financial rewards for decisions that reduce risk.

Even Boulder, Colorado—seen as a leader in reducing fire risk—has had difficulty mustering political will, and its largest success in limiting home growth in places of risk stems from their open space initiative, which was not implemented because of wildfire concerns.

This lack of will, and resistance to regulatory solutions along with the traditional scarcity of resources in most jurisdictions for any new major initiative, means that no city or county has undertaken systematic reform, even though redundancy of responses is one of the characteristics of resilience and safety preparedness. It appears that new solutions most likely will require outside incentives, costs, or new regulations to compel local community debate and action to improve current and future wildfire safety. One exception is Flagstaff, Arizona, which has a good Firewise program and recently passed a bond measure to fund fuel treatment beyond city limits, beginning to address fuel management deeper in the forest, rather than just in WUI areas.

To date, the WUI protection efforts that have occurred have focused largely on reducing fuels and making structures safer from fires. While these activities are necessary, they are not sufficient to control the rising costs and risks of protecting structures in the WUI from wildfires. The rising costs—both

human and financial—indicate that we must find more ambitious or systemic ways to address wildfire risk. If not, it will mean more lives and homes lost, at a growing cost to the federal taxpayer.

Going forward, reform efforts must go beyond encouraging current activities that are focused largely on reducing fuels and making existing structures safer from fires. While these preventive steps are necessary, they are not sufficient to control wildfire risk and the rising cost of protection and suppression.

We propose that the communities we surveyed are typical for jurisdictions across the West. Clearly cities and counties must do more, and these case studies highlight that communities across the West need help addressing wildfire risk. One of the key reasons that local communities fail to act is that they rarely bear the full costs of suppressing wildfires. In that sense, federal and state policies (such as reduced funding or targeted assistance to help communities muster the necessary resources) can help limit or restrict future WUI risks. The alternative is that more tragedies will force counties to take action.

Immediate steps could include the increased development and dissemination of information for wildfire protection—increasing and requiring the use of Firewise, mapping water sources and access routes, developing warning systems, and the like.

Longer term options also are available to expand WUI protection. At the federal funding level, incentives could encourage such state and local responsibility through assistance for local planning. Other options would influence individual behavior, such as policy changes to eliminate the mortgage interest tax deduction for homes in the WUI or requiring federal wildfire insurance for any WUI development near federal lands.

Federal policies also could impact state and local governments, such as by requiring these jurisdictions to take responsibility for WUI development if they are to be eligible for fire suppression or Federal Emergency Management Agency funding, or billing counties for their full share of fire suppression costs. All of these efforts share the same aim: prompting local jurisdictions to use tools such as zoning ordinances, building codes, set-back requirements, and more to limit future development in the WUI.

The following eight case studies from across the West look at how communities are addressing wildfire risk, how they have responded to recent major fires, and what useful lessons and public policy insights they provide for the future.

Communities have a wide variety of regulatory and land use planning options available to them when considering efforts to reduce future risks and costs from wildfires. In 2011, Clarion Associates, assembled a comprehensive list of potential tools for the Fire Protection Research Foundation.[13] These tools, especially when integrated with local community plans, can provide cities and counties effective ways to improve wildfire safety while reducing future costs.

[13] Clarion Associates. 2011 Regulatory and Planning Tools. Denver, Colorado. Available at: http://www.nfpa.org/~/media/files/research/research%20foundation/rfwuiregulatoryassessment.pdf.

VII. PLANNING TOOLS AVAILABLE TO COMMUNITIES TO REDUCE WILDFIRE COSTS AND RISKS

WUI Regulatory Tools

- Hazard mapping
- Community or subdivision level site review
- Subdivision layout, access, water supply, and density rules or incentives
- Individual building and lot management standards
- Structure protection (primary, secondary, and signs)

Administration of WUI Regulations

- Notification of fire hazard area
- Compliance and enforcement
- Consistency with other codes
- Incentives and cost-sharing
- Public education

Land Use Regulations

- Comprehensive plan/zoning policies (i.e., reduction of fire risk as a zoning purpose)
- Subdivision controls (parcels, defining risk areas, etc.)
- Overlay zoning for specific risks
- Incentives and Transfer of Development Rights (TDR) programs
- Site plan review
- Growth management (using wildfire risk criteria
- Maintenance and operation standards
- Development agreements
- Enforcement

VIII. BOULDER COUNTY, COLORADO

Background

During the past several years, Boulder County and the Front Range in general have experienced a number of costly fires. The fires are especially important because of the high number of homes they destroyed. Four major wildfires in Boulder County since 1989 collectively destroyed more than 250 homes and burned more than 16,000 acres. The most recent, the Fourmile Fire in 2010, is still vivid in many peoples' memories as it destroyed 169 homes.

Other communities along the Front Range have experienced even more damaging fires in the past few years. The High Park Fire in 2012 near Ft. Collins destroyed 259 homes, and Colorado Springs saw the two most damaging fires in the state's history: the Waldo Canyon fire in 2012 that destroyed 346 homes and the Black Forest fire in 2013 that destroyed 486 homes.

Boulder County, Colorado

- Population: 305,318
- Total county acreage: 450,781 acres
  - Private: 177,508 acres, 39%
  - State: 3,849 acres, 1%
  - Federal: 168,051 acres, 37% (30% Forest Service)
  - Forested: 175,805 acres, 39%
- WUI size: 85 square miles
  - Developed: 44 sq. miles, 52%
  - Not developed: 41 sq. miles, 48%
  - Homes in WUI: 7239 homes, 6% of total homes
  - Second homes in WUI: 1,687 homes, 23% of WUI homes

As part of its overall fire planning, Boulder County has mapped the county into two parts—basically developed and undeveloped in an East-West split (see map at the end of this case study). These areas are known as Wildfire Zone 1 (less developed area west of Boulder) and Wildfire Zone 2 (cities and developed lands east of Boulder).

Policy

Boulder County's Comprehensive Plan limits any significant new commercial activity to city limits. The county's open space policies also have had the effect of driving most new homes to already developed areas. The open space policies in the Comprehensive Plan were not implemented with fire concerns in mind, but rather with the goals of preserving land and promoting economic development. The impact on fire-related issues was not a priority at the time.

As a result of the open space policies' restrictions on building, local officials are less concerned about new construction than about existing homes. They use a triage tactic that focuses on the biggest pressing issue—the immediate public safety danger of existing homes—rather than future risks from WUI expansion. The focus on mitigation and building codes has been in place since at least 1989 when the Black Tiger Fire caused the creation of the Boulder County Wildfire Mitigation Group, an initial effort that focused on such coordination efforts.

Boulder County's fire-related efforts are supported through the General Fund. In 2012, $1 million of the total $6 million for this effort went to mitigation work on county land. Most of the rest goes to staffing, equipment, etc.

The county's focus on existing homes has driven recent policy actions. Most recently, Boulder County started Wildfire Partners, a voluntary program funded by the Colorado Department of Natural Resources to help homeowners better protect their property from wildfire.[14]

Boulder County also has taken action toward new homes built within the allowable area, recently updating its residential regulations as part of the county's effort to keep pace with the International Building Code.

The large fires discussed above, along with Boulder County's existing open space and commercial regulations made an upgrade of the building and property codes relatively uncontroversial politically. Five agencies (Sheriff, Emergency, Parks, Land Use, and Commissioners' Office) in Boulder County share responsibility for fire, building codes, and related policies. While the Commissioners' Office often coordinates policy, each of the other departments provides specific expertise and worked as a group to update the policy.

The new regulations require that new homes have a site plan, which incorporates Firewise-type restrictions for building codes and landscaping, but does not preclude actual building in highly fire-prone areas. Building restrictions are more stringent in Zone 1, with higher standards for both building and landscaping (foothills west of Boulder).

When interviewed about these policies, county staff made several important public points that drove their decision-making:

1. More fires will occur in the Wildland-Urban Interface (WUI), including extreme fire behavior;
2. Not nearly enough firefighters or engines are available to protect homes; and,
3. The county cannot guarantee (or regulate) the maintenance of defensible space by homeowners, whether it be trees, shrubs, grasses, storage of firewood, pine needles accumulating in gutters and valleys, or other features.

"Our basic premise then is that, at the time of new construction, we should achieve the highest level of ignition-resistant construction that we're reasonably able to achieve," said one staffer. "And that this is a near-permanent feature that won't grow back or be greatly reduced in its effectiveness by a lack of maintenance or the passage of time."

Boulder County officials say that even just upgrading and enforcing new policies for existing structures will challenge government capabilities because of the lack of both staffing and funding. They described the political will for restricting future home building as "Ok, but not great."

In 2011, residents who lived mostly in Zone 1 of the county considered an effort to create a "Boulder County Mountains Forest Improvement District," which would have utilized property or sales taxes to pay for mitigation projects in the western, unincorporated part of the county.[15] The effort initially was suggested by a citizen advisory board. But even though the vote was only one year after the Fourmile fire, 59 percent of voters opposed an initial effort to create an advisory board for the district (i.e., just to

[14] Details on this new program can be found here: http://www.wildfirepartners.org/.

[15] http://www.dailycamera.com/ci_19071090.

get started, not to dedicate tax money), with opponents saying that they did not know enough about future costs or what projects would be funded.[16] Had it been created, the Improvement District would have focused primarily on thinning, slash pile removal, and near-house work rather than on zoning or place-based building restrictions.[17]

Staff took away several discrete lessons from the failed ballot:

- There is still a general tax aversion, especially in more rural locations;
- The issue of who would pay (western county voters wanted the entire county to pay) came up repeatedly; and western residents believed that wildfires would impact all of the county but that only they would pay; and,
- Much more education is needed about the benefits of remedial fire-safety and near-home thinning.

Since the 2011 vote, mayors of several mountain towns in Boulder County—the 'Mountain Mayors'—have started to meet monthly to discuss fire-related issues. Most are supportive of voluntary Firewise-type regulations for the county but it remains unclear how much progress they will make.

Lessons Learned

- Despite recent large wildfires within the county, and record-setting home destroying fires nearby, many local residents oppose significant safety regulations or taxes.
- Boulder County restricted building in the interest of preserving habitat, recreation areas, and property tax values, but the result has been to reduce wildfire risk as well.
- One of the prime concerns of the more rural communities in Boulder County is control. There are continuing tensions and concerns about what these residents see as top-down—or countywide—regulations. So county officials are working to involve those communities more directly and have them take the lead (i.e., Mountain Mayors).
- The political distance between parts of the county shows the difficulty of coordinating resources and policies.
- Boulder County, which has one of the most progressive land-use planning efforts in the West, still has opted not to explicitly restrict new building in the WUI. Their near-term focus is to try to continue to work on relationships within the county—both to make the case for future mitigation and Firewise type regulations and to build trust for longer-term efforts.

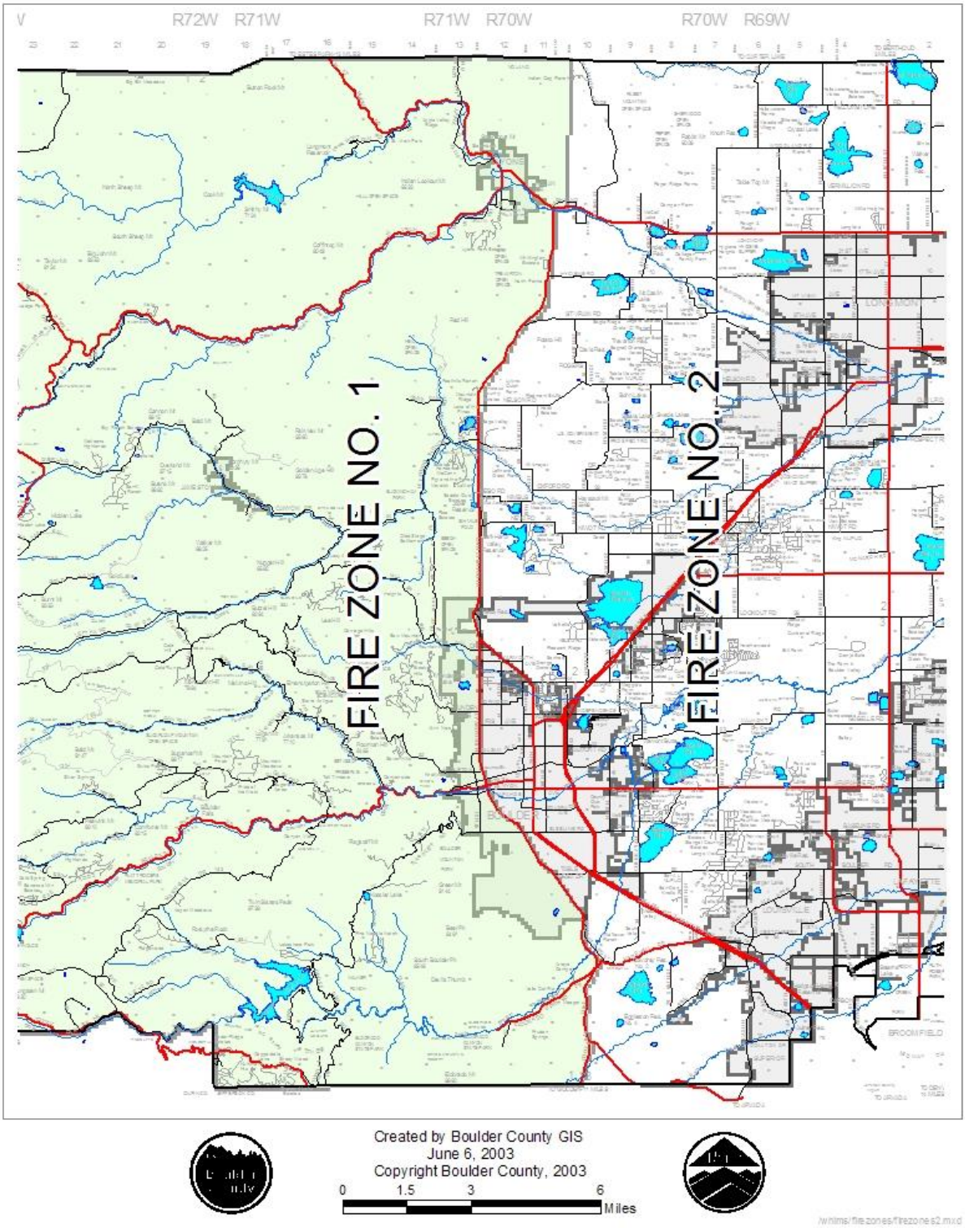
Resources

Megan David, formerly with the county commissioners office has since left that position. The Boulder County Land Use Department can be reached at 303-441-3930,
Gary Goodell, Chief Building Official
Andrew Notbohm, Wildfire Mitigation Specialist

[16] Fryar, J., "Boulder County voters turn down road repair bonds, forest improvement district." Colorado Hometown Weekly News. November 3, 2011. http://www.coloradohometownweekly.com/news/ci_19256659.

[17] http://www.dailycamera.com/election/ci_19071090

WILDFIRE ZONE MAP



IX. LA PLATA COUNTY, COLORADO

Background

Wildfire is an urgent issue in and around La Plata County due to the high number of lightning strikes that turn into wildfires. Some 370 communities in La Plata County—or about 70 percent of the county—are considered at "high risk" for wildfire.

In 2002, the Missionary Ridge Fire near Durango started on private land and spread onto federal land, burning 71,739 acres and 56 homes. Significant fires have burned in several years since then as well. A fire in late October and early November of 2012 burned entirely in the area of the Missionary Ridge Fire. While the timing once would have been unusually late for a wildfire, recent drought has extended fire season by about two months, so that fires burning into November and even December no longer are unusual. As in other areas, post-fire flooding has created extensive damage as well, often causing more harm than the fires themselves.

La Plata County, Colorado

- Population: 52,401
- Total county acreage: 1,807,823
  - Private: 446,091 acres, 41%
  - State: 22,825 acres, 2%
  - Federal: 421,519 acres, 39% (mostly Forest Service)
  - Forested: 337,225 acres, 31%
- WUI size: 57 square miles
  - Developed: 29 sq. miles, 51%
  - Not developed: 28 sq. miles, 49%
  - Homes in WUI: 6,407 homes, 25% of total homes
  - Second homes in WUI: 2,689 homes, 11% of WUI homes

La Plata County began to recognize the urgency of wildfire in the mid-1990s with the Mesa Verde fires. The Forest Service and Bureau of Land Management (BLM), seeing that fires were growing in size and intensity, contracted with the Office of Community Services at Fort Lewis College to write a Community Wildfire Protection Plan. One recommendation in La Plata County's fire plan was to start a grassroots organization to educate people. The recommendation coincided with the Missionary Ridge Fire, which served as even greater motivation to educate the community about fire risk.

In 2003, Firewise Southwest Colorado grew out of a Firewise Community workshop held in La Plata County. At the same time, the Forest Service and BLM were also trying to educate people about fire, conducting managed fires, and people were getting used to the idea. At that time, Southwest Colorado led the nation in being pro-active.

Every February or March, all fire response agencies, including feds, state, sheriff, etc. meet to make their annual fire operating plan, which generally entails a multi-agency response, unified command process.

Policy

After the Missionary Ridge Fire, several ideas were proposed to increase building and landscape standards within the WUI. None of these passed, however. Many residents did not see the need, and many had not yet recognized the extent to which years of drought would affect wildfire risk, which Butch Knowles in the Office of Emergency Management considers a major factor in the greater number

of fires the county experiences. In addition, local developers have strongly resisted any regulations, concerned that the additional upfront costs would be enough to drive people away.

While some others have countered that any initial extra costs imposed by regulations should not deter people—because homeowners will have to do mitigation actions themselves for insurance reasons—currently there are no specific building codes or fire mitigation regulations in La Plata County.

While there are no WUI standards, the county does have "a phenomenal" Firewise program, according to the fire marshal. Firewise Southwest Colorado is working with Colorado State Forest Service to make Firewise recommendations on a subdivision level, more specific than at the county level. The county currently has 17 subdivision-level CWPPs, with 12 more underway. The recommendations in the CWPPs aim to "retrofit" the subdivisions. They address not just defensible space, but also overall preparedness, including better access for emergency vehicles, turnouts, widening cul-de-sacs for fire trucks that cannot turn around, additional water storage, and secondary egress routes. Rather than engaging individual homes one by one, the CWPP have encouraged broader mitigation work and have been instrumental in helping subdivisions prepare for fire.

Individual subdivisions also have Firewise "ambassadors"—volunteers who work to educate neighbors and organize Forest Service property assessments. Funding for Firewise Southwest Colorado has been a combination of Title III money and grants from Forest Service and other agencies, as well as some private donations.[18]

Pam Wilson of Firewise Southwest Colorado says that county residents are highly educated, interested in land management and forest health. Firewise emphasizes the responsibility to be a good steward of the land, which is something people take seriously. They value their environment and do not want it destroyed by fire. Residents appreciate that fire mitigation also helps create a healthy forest and accept that firefighters shouldn't have to put their lives on the line to protect a house. Even so, she says, people do not immediately accept or like the appearance of mitigated areas; most people want a "natural" look, whereas mitigation creates too much of a "park-like" look.

According to Butch Knowles in the Office of Emergency Management, one significant difficultly with carrying out mitigation is how to dispose of resulting debris: there is no place to get rid of slash. Burning is often not allowed.

There are some development standards for new subdivisions, and the fire department can comment on the development relative to its needs, which might lead the agency to require things like underground storage tanks for water. But other than that, and the Firewise program, "the county commissioners still haven't done a thing" to improve wildfire risk in the county, according to one fire official.

Some attribute the lack of action to the strong private property rights movement; others say that people have been slow in recognizing the problem. Butch Knowles thinks that after seeing so many homes in Colorado burn in the 2013 fire season, La Plata County may begin to take action in implementing fire safety standards of some sort. He recognizes, however, that mitigation standards are difficult, costly, and

[18] Title III funding is part of the Secure Rural Schools and Community Self-Determination Act (SRS). The future of SRS remains in question as Congress has been willing to approve only one year extensions, usually at reduced funding levels.

time-intensive to enforce. He is not sure that an ongoing enforcement program would be feasible, given the current county budget. The Office of Emergency Management can barely keep up with existing programs, much less begin anything new.

Construction has slowed in the past few years as the economy declined. In the 1990s, the county issued about 500 permits a year, whereas it now issues about 120. Marcie Bidwell of the Mountain Studies Institute in Durango says La Plata County is 65 percent public land; of the private land, 90 percent to 95 percent already is subdivided. She thinks less than five percent of the county would be affected by any land use code that is aimed at restricting development. Referring to zoning or development restrictions, Pam Wilson says, "I don't know how much code would gain us unless it was about retrofitting." And she believes that government should not step in and tell people how to do things.

While the fire marshal believes that requiring the county to take on more of the costs of firefighting—"this is the beginning of the solution"—restricting development is an unlikely option in La Plata County. Butch Knowles would consider it a "takings" and believes that people would seek lawyers to defend the "normal use" of their property.

Lessons learned

- La Plata's Firewise program depends on the dedication of volunteers. The program has been relatively successful in part because it appreciates the value of starting small and recognizes that every step counts.
- Officials note that more educational tools and opportunities would be useful, to help people understand how fires work and how mitigation activities can be beneficial, including showing people photos of fires and how they burn as well as what defensible space looks like.
- That said, and despite serious concern about wildfire and recent experience with destructive fires, strong resistance to regulation on the part of residents and many officials has prevented taking fire prevention efforts any further than the Firewise program.

Resources

Butch Knowlton, Director of Office of Emergency Management, (970) 382-6274
Pam Wilson, Firewise of Southwest Colorado Program Director, La Plata County Coordinator,
Karola Hanks, Fire Marshal, (970) 382-6023
Fire Prevention Offices http://www.durangofireresc ue.org/prevention.html
Marcie Bidwell, Mountain Studies Institute, Fort Lewis College (970) 382-6908

X. CITY OF FLAGSTAFF IN COCONINO COUNTY, ARIZONA

Background

Ponderosa Pine forests, mostly federal- and state-owned, surround the city of Flagstaff, and wildfire is considered the principle threat to the community. Wildfire activity began to increase in the mid-to-late 1990s. In 1996, several fires burned within city limits and extended into the Coconino National Forest. The 2010 Schulz Fire burned 15,000 acres in the mountains to the north of Flagstaff, evacuating over 700 homes. Though none burned, significant damage was caused by floods that followed soon after the fire.

According to Diane Vosick of the Ecological Restoration Institute (ERI) at Northern Arizona University, severe wildfires in recent years "are blowing people's minds in terms of temperature and behavior." After the 1996 fires, the city council, responding to public outcry, decided that wildland fire risk needed to be addressed. The Wildland Fire Management division of the Flagstaff Fire Department was formed to carry out forest thinning, fuel reduction, and prescribed fires, both for fire safety as well as general forest health.[19]

The Wildland Fire Management division also partners with GFFP (Greater Flagstaff Forests Partnership), a collaborative non-profit with members from state and county government as well as Northern Arizona University School of Forestry, Arizona Fish and Game, and environmental non-profits. GFFP presents a unified voice regarding decisions on forest lands and in response to Forest Service Projects, provides comments for Forest Service, and does public education, outreach, and monitoring.

Coconino County, Arizona

- Population: 136,011
- Total county acreage: 11,941,017
  - Private: 1,612,090 acres, 14%
  - State: 1,121,278 acres, 9% (mostly trust)
  - Federal: 4,759,645 acres, 40% (69% type c)
  - Forested: 1,074,692 acres, 9%
- WUI size: 90 square miles
  - Developed: 17 sq. miles, 19%
  - Not developed: 73 sq. miles, 81%
  - Homes in WUI: 13,983 homes, 22% of total homes
  - Second homes in WUI: 6,209 homes, 43% of WUI homes

In 2006, the fire department conducted a citywide neighborhood threat assessment, with a weighted GIS overlay to determine risk, based on eight factors (road, water, roof, construction materials, etc.). The department distributed it to the general public as a way of encouraging people to do mitigation work based on their risk status.

The community of Flagstaff is steeped in information about forest health. The first Forest Service experiment station was established near Flagstaff, and the director of ERI, Wally Covington, is internationally known for advancing forest restoration and educating people about forest health.

[19] The Wildland Fire Management division is unique because two of the three full-time permanent staff have backgrounds as arborists as well as firefighters.

Nevertheless, when the Wildland Fire Management division started treatment work in the forests surrounding Flagstaff, the general public was not in favor of cutting trees, according to Mark Brehl wildland fire leadworker. The department began to do public outreach and education, in conjunction with ERI, providing literature and explanations based on scientific studies about why such measures are important. Slowly people began to support—and expected to see—thinning and prescribed fires in the forests around Flagstaff. Today, there is a buffer extending for several miles to the southwest of the town.

Policy

In 2007, the Arizona Forest Health Council presented a strategic plan for restoring the state's forests. The plan made recommendations to local governments, including adopting building codes and standards to protect structures in place. But local communities and the state as a whole have made little progress in implementing those recommendations, often using the economy as an excuse.[20]

Flagstaff has been more aggressive than other areas in Arizona in addressing wildfire risk. Until 2008, the city followed the Uniform Fire Code (UFC), geared toward structure fires. In the mid-1990s, as an addition to the UFC, the fire department created the Rural Development Standards, which required forest thinning, depending on vegetation, slope, and access. In 2008 the fire department pushed the city to adopt an amended version of the International Code Council Wildland Urban Interface code (ICC WUI code),[21] clarifying and codifying much of what they were already doing and making it easier to enforce. The code has been well received by residents and even most developers. Even those who do not initially support the required hazard mitigation work, in the end usually "welcome it with open arms, because they find they can recoup their costs," according to Brehl.

The ICC WUI code applies to all new development. Each property is assessed prior to new construction and applicants are required to conduct hazard mitigation (forest thinning) around the entire parcel (even if the parcel is ten acres with just one house), do a resource inventory for resource protection, and remove dead or weak trees. Slope, water supply, and building materials may prompt additional requirements. The fire and building departments are responsible for enforcement.

For existing properties, the new code is not retroactive. It only applies to existing properties if owners do significant repairs or make additions. Otherwise, mitigation work on existing properties is enforced only when the division receives a complaint from someone (in which case, the complainer's property is also always assessed).

The ICC WUI code requires that the WUI area is defined. Nearly the entire town of Flagstaff falls under the city's WUI definition, except places like the airport, shopping mall, and Route 66 corridor. Mark Brehl, however, considers the whole city to be within the WUI, because a wildfire could heavily impact most everywhere.

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[20] See http://nau.edu/Centers-Institutes/ERI/Publications-Media/News-Archive/08/11/13--Arizona-s-wildfire-solutions-languish/.

[21] International Code Council. National Wildland Urban Interface Council. http://www.iccsafe.org/gr/WUIC/Pages/default.aspx.

Funding for the code adoption process came from the city general fund. The Wildland Fire Management division receives funding from the general fund as well as grants from external agencies. The division also applies for and administers grants to help people do thinning and other mitigation work on private land.

The Wildland Fire Management division focuses more on education than on strict enforcement, with the idea that if people know they are at risk, they will want to do mitigation work. And it often turns out to be the case—even with developers—that education alone is enough to spur action, says Brehl. In existing developments, where mitigation is not required, people sometimes do not want to do as much prevention as possible, but often come back a year or two later to do more. Brehl acknowledges that after thinning, properties often do not look good immediately, "but you can't fix 130 years of bad management quickly."

The Schultz Fire of 2010, though it did not burn any homes, led to flooding that devastated neighborhoods and cost between $133 and $147 million in recovery efforts, according to a full cost accounting study done by ERI.[22] Since the post-fire flooding risk became clear, fuel treatment work has shifted to the mountains to the north of the town, in order to reduce the risk of severe fire and flooding in the watersheds that feed into Flagstaff. The cost accounting study highlighted that fire suppression is only part of the long-term cost of fire.

The Schulz Fire had another significant effect on Flagstaff's fire mitigation work: in spring of 2013, voters approved a $10 million bond to fund thinning and prescribed burns (slash and pile as well as broadcast burns) outside of city limits, on state and federal land.[23] Bond money will go to fund treatment in the San Francisco Peaks area bordering Flagstaff—where a fire like the Schulz Fire could cause billions of dollars in damage to the city—as well as Mormon Mountain—where a fire would likely push ash and debris into Flagstaff's drinking water supply, says Diane Vosick.

Convincing voters to pass the bond measure was not difficult, because after ten-plus years of outreach and mitigation work, residents are "pretty savvy" about fire management, Brehl says. The Schulz Fire drove home the message that if—or when—these mountains burn, the impacts on Flagstaff could be devastating. One expert estimated that the flooding could surpass by 10 times the 100 years flood.[24] Despite the expected support, the city did extensive campaigning to inform the public of the need for the bond. It passed with 73.6 percent approval, impressive for an area with conservative ideas about government spending, emphasizes Brehl.

The Wildland Fire Management division recognizes that fires will continue to occur despite mitigation work, but believes that mitigation can create a safer environment and reduce severity of the fires. Diane Vosick agrees that hazardous fuel treatments in WUI areas are effective (see ERI study on the economic and ecological effectiveness of hazardous fuel treatments[25]), however, the focus on treatments in WUI

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[22] The fire led to a full cost accounting study by the Ecological Restoration Institute at Northern Arizona University. Available at: http://nau.edu/ERI/Publications-Media/Recent-ERI-Publications/.

[23] See Flagstaff Watershed Protection Project. http://www.flagstaffwatershedprotection.org/about/background/.

[24] *Ibid.*

[25] Available at: http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/D2013004.dir/doc.pdf.

areas means that areas deeper in the forest are neglected. This is critical, she says, because that is where many wildfires start. It is not effective to just reduce fuels in WUI areas or near towns. According to Vosick, Arizona is "underinvesting in the problem"—treatment in the forest is as critical as in WUI areas.

At the same time the community has been strongly proactive in funding forest treatment work, Flagstaff has not enacted any restrictions on where people can build. As Vosick puts it, people in the Flagstaff area do not have "much appetite for zoning" and their attitude that they live in a wild place and should be able to do what they want with private land prevails.

Mark Brehl says that the topography of the city proper would not require building restrictions because it does not present too much of a risk for homes. All new building will have to comply with the ICC WUI code, which he believes is sufficient to reduce fire risk. Some older, already developed areas of the city are in thick forest where mitigation work has not been done because it would be so cost-intensive.

The city is fairly well contained, Vosick agrees, though management constraints mean that the forest edge is not as well treated as it could be. The real problem, however, is "wildcat" subdivisions in the county (and state) as a whole. The county is constrained from regulating wildcat subdivisions because the state holds that authority.

Lessons Learned

- Flagstaff has taken and funded more measures to reduce the costs and risks wildland fires than most communities in the West. Officials attribute their success to an early dedication to building strong partnerships among interested parties along with strong education and outreach programs. Local leaders recognize that there are no quick and easy fixes, and that they must set policy for the long haul and expect to encounter problems, obstacles, and failures along the way.
- However, even a community like Flagstaff, with a history of devastating fires and the motivation to put tax dollars to work in improving forest health, is still reluctant to enact land use regulations to direct or deter development near fire-prone lands.
- Many local officials, often because of political reasons or the lack of cooperation between the local and county planning, have embraced mitigation as sufficient to reduce future risks.

Resources

Mark Brehl, wildland fire lead worker, Division of Wildland Fire Management, (928) 213-2595
Diane Vosick, Ecological Restoration Institute, (928) 523-7854
Flagstaff Watershed Protection Project: http://www.flagstaffwatershedprotection.org/faqs/#area
Greater Flagstaff Forests Partnership: http://www.gffp.org/

XI. EL DORADO COUNTY, CALIFORNIA

Background

El Dorado County spans foothill oak woodlands and high-elevation pine forest, from approximately 750 feet to 6,225 elevation. Residents live in compact towns, sprawling subdivisions, and dispersed ranches, foothill, and mountain homes. Between 1990 and 2000 the county experienced a 24 percent increase in growth. Relatively small fires burn regularly in El Dorado County.

According to fire prevention specialist Teri Mizuhara with CAL FIRE in El Dorado County, "fire is always on the front page of everyone's book." Though while everybody understands and accepts the risk of living with wildfire, "homeowners roll the dice and figure it's not going to happen to them." The most recent large fire was the 2007 Angora Fire, which burned 242 homes, 67 commercial structures, and 3100 acres in a subdivision near South Lake Tahoe.

All rural land in California, including private forest and ranchlands and rural lands owned by state and local governments, is classified as State Responsibility Area (SRA). The California Department of Forestry and Fire Protection (CDF or CAL FIRE) is responsible for fire protection on these lands.[26] More densely populated areas in incorporated cities and towns (defined as more than three houses per acre) are referred to as Local Responsibility Areas (LRA). City fire departments, fire protection districts, counties, and CAL FIRE (under contract to local government) provide fire protection in LRAs. Fire districts also often protect homes and structures in SRAs. The federal government is responsible for National Forest and BLM land.

El Dorado County, California

- Population: 180,561
- Total county acreage: 1,143,263
  - Private: 565,736 acres, 50%
  - State: 12,356 acres, 1%
  - Federal: 564,574 acres, 49%
  - Forested: 628,795 acres, 55%
- WUI size: 202 square miles
  - Developed: 70 sq. miles, 35%
  - Not developed: 133 sq. miles, 65%
  - Homes in the WUI: 29,504 homes, 34% of total homes
  - Second homes in the WUI: 8,946 homes, 30% of WUI homes

In El Dorado County, SRA land amounts to 564,600 acres,[27] so CAL FIRE is responsible for the bulk of fire protection. Parts of the county are densely developed, but a significant amount of land remains open, with development potential. Several Fire Safe Councils throughout the county encourage Firewise practices and about five communities in the county are Firewise certified. The CAL FIRE Fire Prevention Officers Association is involved in planning infrastructure correctly for build-out of the community.

Policy

California first instituted minimal fire safety regulations in the 1960s and 1970s. One of the requirements was 30 feet of defensible space around homes. In 1992, the El Dorado County Community

[26] Less than 1% of the SRA land in California is public land.

[27] Sierra Nevada Alliance. www.sierranevadaalliance.org/.

Development Department adopted SRA fire safe regulations that address issues like road width, turnouts, road grade, and water availability. Only where county standards are stricter than state do they take precedence, which may be the case at certain elevations and in certain snow conditions. Federal agencies and LRAs usually adopt the state regulations.

CAL FIRE created hazard zone maps for each county in California, in response to the urban Oakland Hills Fire in 1991. The maps do not take into account any mitigation activity that may have been done that would affect the risk of wildfire in a given area, just the physical conditions of an area that affect its likelihood of burning.

In 2008, new state standards came into effect that increased the defensible space requirement to 100 feet instead of 30 feet and began to require fire resistant materials in construction.

El Dorado County is currently in the process of adopting the ICC fire code for all eight of the fire districts (the two districts near Lake Tahoe will differ slightly to account for different needs in their area). Previously, each district made individual changes to the ICC code and ended up following distinct codes.

The State of California has imposed an annual "Fire Prevention Fee" ($152.33 effective July 1, 2013) on all habitable structures within State Responsibility Areas. While the amount is too little to discourage development, it was designed to fund fire prevention services within the SRA, including brush clearance around communities and forest health activities.[28] Homeowners whose property also falls within a local fire protection district will receive a refund of $35. The law raises roughly $95 million to help CAL FIRE carry out prevention activities, especially needed because of recent budget cuts.[29]

Some fire districts in El Dorado County (and other counties) have formally opposed the law[30] and the Howard Jarvis Taxpayers Association has mounted a "fire tax protest," claiming that the law amounts to an additional tax, which would be illegal under California Proposition 13.[31]

Also at the state level, in 2012 the state legislature passed a bill (SB 1241) to give CAL FIRE a seat at the table in land use planning decisions. The bill also funds CAL FIRE personnel to provide fire safety information to counties as they develop their general plans.

CAL FIRE Unit Chief for Amador and El Dorado counties declined to answer whether or not CAL FIRE would recommend that certain areas not be developed due to fire danger. He emphasized that the mitigation standards, such as fuel breaks, that CAL FIRE and the counties would require would be sufficient to reduce fire danger so as not to impede development.

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[28] CAL FIRE website http://www.firepreventionfee.org/.

[29] Hickey, B. 2013. "CAL FIRE sending bills for fire prevention." July 15, 2013. KCRA.com http://www.kcra.com/news/cal-fire-sending-bills-for-fire-prevention/-/11797728/20979372/-/cqitr3/-/index.html?absolute=true.

[30] El Dorado Hills Fire Department. SRA fire prevention benefit fee. http://www.edhfire.com/news-events/news/sra-fire-prevention-benefit-fee.

[31] Howard Jarvis Taxpayers Association. http://firetaxprotest.org/.

Another CAL FIRE staff member recognizes that if federal support were to end, the county could not handle it the subsequent increase in costs.

Lessons Learned

- Compared to most other communities across the West, California counties benefit from state action such as the creation of statewide hazard zone maps, a defensible space requirement, and a fee on homes in rural areas.
- El Dorado has encountered obstacles to any further prevention efforts, similar to obstacles faced in other western counties, including anti-regulatory sentiment and a sense that mitigation will suffice.
- Going forward, CAL FIRE will be "at the table" when counties are developing general land use plans, helping greatly with education, sharing resources, and coordination between agencies.
- But local restrictive land use planning to reduce fire hazards seems unlikely given the sense that mitigation will suffice.

Resources

Teri Mizuhara, Fire Prevention Specialist, CAL FIRE, Amador and El Dorado counties (530) 644-2345
Janet Upton, CAL FIRE Deputy Director, Communications, (916) 653-4500
Brandon McKay, Fire Prevention Specialist, El Dorado County, Placerville District, (530) 644-9630
Kelly Keenan, CAL FIRE Unit Chief, Amador and El Dorado counties, (530) 708-2700

XII. KITTITAS & OKANOGAN COUNTIES, WASHINGTON

Background

Kittitas and Okanogan counties both span diverse topographies, and their natural scenery and recreational activities draw second-home owners from the urban Puget Sound area.

Kittitas County is comprised of two distinct topographies and vegetative types. Lower County is composed of mostly agricultural fields, scrubland, and sagebrush. In Upper County, the area of most fire concern is heavily forested, with steep terrain, single access points, and a lot of slash from deforestation. It also has a significant number of homes for a rural county. Development is more limited at the top of the Cascades, though it is also steep and heavily forested.

According to the Kittitas County Community Wildfire Protection Plan (CWPP), "Most of Kittitas County…is considered an extreme or high hazard fire area, based on weather, fuel moisture content, topography, vegetation, slope, aspect and access to properties." More than half of the county is forested, much of which can be considered to fall within the WUI. State forests are much more extensive than National Forests in the county. There are seven fire districts, largely staffed by volunteers. The county has a contractual agreement for mutual aid with the Department of Natural Resources and the Forest Service, which is critical to the fire departments' ability to do fire suppression.

The Cascade Mountains separate Kittitas County from adjacent King County, the most populated county in Washington. Kittitas is a destination area for tourists and outdoor recreationists, many of whom buy second homes in WUI areas. According to the fire marshal, developers from King County have built homes "willy-nilly" in Kittitas County, taking advantage of the county's lack of resources and inability to require mitigation, additional access, and other fire protection measures. Many multi-million dollar homes with no fire safety protections have been build on steep grades without adequate access.

A decade ago, in 2004, wildfires near Cle Elum burned 600 acres and two homes in the agricultural areas of

Kittitas County, Washington

- Population: 41,672
- Total county acreage: 1,491,872
  - Private: 464,359 acres, 31%
  - State: 378,505 acres, 25% (trust and other nearly equal)
  - Federal: 643,036 acres, 43% (FS and Military)
  - Forested: 611,668 acres, 41%
- WUI size: 129 square miles
  - Developed: 17 sq. miles, 14%
  - Not developed: 112 sq. miles, 87%
  - Homes in WUI: 5,518 homes, 25% of total homes
  - Second homes in WUI: 2,761 homes, 50% of WUI homes

Okanogan County, Washington

- Population: 41,275
- Total county acreage: 3,390,109
  - Private: 812,611 acres, 24%
  - State: 397,458 acres, 12% (mostly trust)
  - Federal: 1,516,544 acres, 45% (mostly FS)
  - Forested: 1,796,758 acres, 53%
- WUI size: 140 square miles
  - Developed: 19 sq. miles, 14%
  - Not developed: 121 sq. miles, 87%
  - Homes in WUI: 2,980 homes, 13% of total homes
  - Second homes in WUI: 1,361 homes, 46% of WUI homes

Lower County.[32] More recently, two major wildfires affected Kittitas County in 2012. The Taylor Bridge Fire started just east of the town of Cle Elum, and burned mostly in Upper County, but also extended into Lower County. In total, more than 36 square miles and 100 structures (61 homes and 35 outbuildings) burned.[33] In some of the housing developments the fire affected, there was only one access point, so people were evacuated by helicopter. The fire marshal says they were lucky that there were no deaths. The Table Mountain Fire began three weeks after the Taylor Bridge Fire. It was a complex fire, affecting several counties.

Fire Marshal Brenda Larsen believes that future fires in some of the developments in Upper County would certainly lead to deaths, because helicopter evacuations would be impossible given the steep terrain. For example, one development, called Pine Loch Sun, was mostly built in the 1960s, with some road grades more 20 percent. Fire personnel are "nervous all summer long," according to Chief Russ Hobbs, and put all resources immediately into anything that comes up, quite aware that a home fire could quickly become a wildland fire.

Okanogan County is the largest in Washington, spanning forest and agricultural landscapes. Scenic and recreation amenities are a big draw for second-home owners, particularly in the Upper Methow Valley. The population is growing quickly, and the new residents are buying single homes interspersed throughout the forest. In the drier eastern area of the county, people cash in on their homes in urban areas (often Seattle) and buy 40-acre spreads. Many new homes are in areas without a fire district and that are not part of the responsibility of either the Forest Service or the Department of Natural Resources (DNR). These homes face the prospect of no fire suppression support in a wildfire.

Okanogan County often experiences at least one or two major fires a year. Large fires in 2012 included the Okanogan Complex Fire (6,169 acres) and the Goat Fire (7,378 acres). Fire is a concern among residents, but is not in the forefront of a lot of people's minds. While a catastrophic fire is likely because of the number of homes and amount of fuel, there has not yet been a fire that has affected residents acutely (they have mostly affected National Forest land).

The Office of Emergency Management as well as the Methow Valley fire chief point to a problem created by the rapid population growth of homeowners from outside the county who often are unfamiliar with the risks. People who move to Okanogan County generally want to be "out there by themselves"—so they build far from neighbors, do not cut down trees, or take other measures to keep fire away from structures, and do not make appropriate access roads. Chief Don Waller likes to tell people, "We don't drive the family Subaru to a fire." New homeowners expect fire protection but do not realize what it takes to do it, and "they complain when they don't get taken care of."

Unlike Kittitas County, which created the post of fire marshal in 2005, Okanogan County's strapped budget has not allowed for hiring a fire marshal, and the fourteen fire districts are staffed almost entirely by volunteers. In addition to the difficulties of combining volunteer firefighting with paid work, the demographics of Okanogan County make relying on volunteers even more difficult. Most residences are

[32] http://www.citizenreviewonline.org/aug_2004/02/hundreds.htm and http://community.seattletimes.nwsource.com/archive/?date=20040801&slug=fire01m.

[33] http://www.oregonlive.com/pacific-northwest-news/index.ssf/2012/08/taylor_bridge_fire_100_percent.html.

second homes, and these owners generally do not want to be volunteer firefighters. The significant number of homes in the WUI makes response time particularly important, which is also difficult with volunteers. In the Methow Valley district, no volunteers are available during the day, but there are four full time paid staff. Property taxes on the high-value new homes in the county offset some of the costs to the fire district that their location creates.

Policy

Brenda Larsen took over the position of Kittitas county fire marshal in 2005 and immediately saw the need for better fire protection standards. She worked with fire districts to determine what district chiefs felt was needed, including the amount and type of building in certain areas. Kittitas County's current fire policy is that all homes in the WUI meet the International Fire and WUI Code, modified and adopted by the county in 2006. The code primarily regulates building and construction materials, onsite water storage for fire suppression purposes, and development and subdivision requirements within the WUI.

The fire marshal identifies levels of fire danger for areas within the WUI—IR (Ignition Resistant) 1 through IR3—or extreme, high, and moderate. Anyone who builds in the WUI must submit building and fire protection plans, and the county then makes construction requirements based on whether they are in IR1, 2, or 3. All areas in Kittitas County outside of a city or county fire district are considered to be in the WUI. According to the county Firewise Firescape Brochure, most of the county is outside of a fire district.

The only funding for fire-related activities comes from the permit fee associated with applications to build in the WUI. The fee is $130.

The Kittitas County Wildfire Protection Plan, developed in 2009, identifies areas of concern in each fire district. It also recommends management tools for fire districts, including homeowner and landowner education; policy changes for structures and infrastructure in the WUI; home and community defensible zones; access improvements; emergency response and communication enhancements; and regional land management recommendations for private, state, and federal landowners. The plan also emphasizes the importance of maintaining private property rights ("Maintaining private property rights will continue to be one of the guiding principles of this plan's implementation") as well as of encouraging practices that are compatible with healthy wildlife habitat and soil conservation.[34]

Current code is not what Fire Marshal Larsen recommended, but resistance from homebuilders and the development community pushed the board to adopt WUI code only in areas outside of fire districts. The board reasoned that if you live in a fire district, you are not in a WUI area, which Larsen emphasizes is not true. She hopes to identify the whole county as WUI, and pre-designate levels of concern, as is now done for only part of the county.

Prior to the 2012 fires, homeowners resisted the WUI codes passed in 2006, trying to entice fire districts to annex their area so they didn't have to comply. Since the 2012 fires, however, public sentiment has changed and the fire marshal receives many calls requesting that property be inspected to be sure that it

[34] Kittitas County Wildfire Protection Plan, p. 104. http://www.co.kittitas.wa.us/firemarshal/.

is up to code. People are now nervous about fire and many seek grants from the Conservation District to make their property safer.

Since the 2012 fires, the Office of the Fire Marshal in Kittitas County has made public education a top priority—something that tended to fall by the wayside because it is difficult to do, particularly in rural areas. Another critical issue, according to Larsen, is on-site water storage for new developments. The WUI code outlines requirements for water availability, but it is a "hot-button topic" and it will be hard to extend to all areas. Developers in the past did not have to account for any on-site water storage other than potable water. In doing so, "I'm costing them money that would otherwise be pure profit."

While Larsen recognizes that restricting building in certain areas would address fire risk most effectively, she says that it is "not a battle I would want to bring to the board" because of the strength of the opposition: "This place is so inured in the belief that your property is yours to do whatever you want." In addition, the development community has a "very strong presence" in the county, making it difficult to regulate access roads, plot size, and where people build.

Don Waller, a district fire chief in Okanogan County, says, "From a local perspective, we're doing everything that I think is reasonable." Restricting development seems to him akin to "telling people they have to live in a city," which is "just not practical, people like living out there." So the only option, he says, is to mitigate the risk of living in WUI areas, which the county is now doing, with the WUI code and promotion of Firewise techniques: "We're doing what we need to do right now."

Okanogan County has no WUI development standards or Firewise requirements for homes. The only regulations on development that potentially affect fire suppression are ingress and egress for roads, which were not originally implemented due to concern about fire. The Building Department has to notify the fire district when a permit comes up, but there are no requirements regarding defensible space, roofs, road sizes, underground power lines—despite being things that fire chiefs would like to see put into place.

The county has mapped the WUI area, using the DNR definition rather than one tailored to the county, but opinions vary as to whether or not the existing map includes enough acreage. Acreage mapped is important in part because it helps obtain grants for fuel reduction, which are needed in the county.

Developers exert a lot of pressure to keep the county from implementing a WUI fire code, saying that they would not be able to afford to build to those standards. Even the countywide association of fire chiefs has been reluctant to enact regulations, enforce Firewise principles, and push for building wider roads, etc., because of the pushback expected from residents and developers.

The DNR and the Forest Service do restoration work, thinning forest and cutting undergrowth in areas with homes and wildland areas, as well as local homeowners associations. If more areas of the county were designated as high risk, as some believe they should be, grants would be easier to come by. The Okanogan Conservation District offers Firewise workshops and free risk assessments of individual properties. The county gets some Title III money for education, but does very little.[35]

[35] Title III funding is part of the Secure Rural Schools and Community Self-Determination Act (SRS). The future of SRS remains in question as Congress has been willing to approve only one year extensions, usually at reduced funding levels.

The county is up against a difficult set of beliefs and preferences, with few regulations and little education to change them. Many homeowners in Okanogan County believe that doing nothing to the forest is best, not recognizing that years of fire suppression may require different management principles. Many are transplants from the western side of the state, where the tightly spaced fir forests have a different ecology and aesthetic than the dispersed Ponderosas of the eastern slope forests.

In addition, many homes in Okanogan County are on steep hillsides with narrow access roads, because people think the smaller the road the better. So far, the mindset of "we're in a rural area, we should be able to do what we want" has trumped concern about fire safety for many residents.

Fire districts are independent of the county and of each other. They are on their own for funding sources. District 6, in the Methow Valley, has the mixed blessing of substantial revenue from high property taxes on WUI homes—which also perpetuates the incentive to keep building homes in the WUI.

As in most of the counties we spoke with, land use planning and fire planning have not been coordinated in Okanogan County. One planner says that it is an old-fashioned, rural county and most people are not aware of the connections. There are some zoning regulations on density in some areas of the county, including the Methow Valley, but they lead to homes being dispersed rather than clustered, which makes fire safety and suppression more difficult. "But people come here to be out on their own."

Because fire districts are independent of the county—and their funding comes from property taxes levied in each district—the financial impact of fire protection is once removed from county coffers, though only the county has the power to enact building codes or fire regulations. The senior planner, however, said that planning is never part of the financial decisions.

As for the effect that shifting the cost responsibility from federal government to local jurisdictions would have, the senior planner says, "I hesitate to say 'more responsible'…but maybe we could find a way to make it easier on firefighters."

Lessons Learned

- Education about the risks and costs of wildfires is a major hurdle for both counties. Many residents have strong perceptions and desires—wanting to live in forested areas far from neighbors, with small access roads—about what their local forest should look like.
- Separate funding and regulating entities contribute to both a lack of sufficient resources for Firewise type activities and also to the absence of land use planning. For example, in Okanogan County, only the county has the authority to enact building codes or fire prevention regulations, but fire districts fund themselves.
- This also leads to little or less cooperation between government agencies that could maximize the limited funding and resources available.
- A proactive fire marshal in Kittitas County has made significant progress in defining the WUI and implementing the ICC WUI code. She attributes a high degree of transparency, a lot of hard data available to policy makers and the public, and partnerships with the development community as critical to the process of revising fire protection standards.

- However, while a fire marshal can advance fire preparedness, pressure from property owners and developers can discourage commissioners from taking more significant action on fire safety, even overriding fire marshal recommendations.
- Counties need greater motivation to enact land use regulations.
- Despite significant growth in the WUI in both counties, neither has taken adequate steps to mitigate fire-prone lands.

Resources

Brenda Larsen, Kittitas County Fire Marshal, (509) 962-7657
Russ Hobbs, District 7 Fire Chief, Kittitas County, (509) 304-5555
County Wildfire Protection Plan and the Firewise Firescape Brochure both available at:
http://www.co.kittitas.wa.us/firemarshal/
Don Waller, Fire Chief, Methow Valley District, Okanogan County, (509) 997-2981
Glenda Beauregard, Program Specialist, Office of Emergency Management, Okanogan County, (509) 422-7206
Ben Rough, Senior Planner, Planning Department, Okanogan County, 509-422-7122

XIII. MISSOULA & RAVALLI COUNTIES, MONTANA

Background

Wildland fires are routine in Missoula and Ravalli counties. Across the state of Montana, 2000 was a benchmark year for fires, raising residents' awareness of fire danger and spurring the legislature and residents to be more aware of fire safety. Just in Ravalli County, 70 homes and more than 356,000 acres burned in 2000.

Significant fires have burned since then, especially in 2003, 2007, 2010, and again in 2013. Communities have become accustomed to smoky air and limited recreational activities in August and September. Winds often carry smoke from southern Idaho into the region as well. The counties suffer the indirect costs of fire through businesses that lose revenue due to decreases in tourism and through public health concerns, like respiratory problems in the elderly and very young. "Fire is the biggest risk that we have—they happen every year at this time on a large scale," said Ravalli County Fire Chief Jim Knapp. And fire season seems to be lasting longer than it used to—well into September.

The city of Missoula is the only incorporated community in Missoula County, and covers about 12 square miles. Approximately 40,000 people live outside the city, almost all in a Forest Fire Protection zone or in the Wildland-Urban Interface.[36] Less than 10 percent of Missoula County's WUI area has been developed. Development pressure in both counties has slowed considerably with the housing crisis and lagging economy, but is gradually reviving. Ravalli County is 73 percent National Forest, so only a small portion of private ground is open to development. The Plum Creek Timber Company is a large landholder in both counties and is selling

Missoula County, Montana

- Population: 110,997
- Total acreage: 1,644,863
  - Private: 653,805 acres, 39.7%
  - State: 173,944 acres, 10.6%
  - Federal: 716,196 acres, 43.5% (mostly Forest Service)
  - Forested: 1,250,096 acres, 76%
- WUI size: 379 square miles
  - Developed: 29 sq. miles, 7.6%
  - Not developed: 350 sq. miles, 92.4%
  - Homes in WUI: 8,945 homes, 13%
  - Second homes in WUI: 1,855 homes, 21% of WUI homes

Ravalli County, Montana

- Population: 40,617
- Total acreage: 1,514,514
  - Private: 346,489acres, 22.9%
  - State: 39,265 acres, 2.6%
  - Federal: 1,128,760 acres, 74.5% (mostly Forest Service)
  - Forested: 969,289 acres, 64%
- WUI size: 451 square miles
  - Developed: 42 sq. miles, 9%
  - Not developed: 409 sq. miles, 91%
  - Homes in WUI: 8,945 homes, 13%
  - Second homes in WUI: 1,855 homes, 21% of WUI homes

[36] The Forest Fire Protection (FFP) zone is a broader classification than the WUI. All WUI areas are also within FFPs, but not all FFPs fall within areas classified as WUI. For example, some open-bowl valley floors may not be classified as WUI, but are considered to be within the FFP. Most of the FFP is on state or federal land. Those who build in FFPs pay taxes to the state. (Personal communication with Chris Lounsbery.)

off their land, creating significant potential for development on private land in WUI areas.

The definition of the WUI area has been controversial Ravalli County. Since first defined by the Community Wildfire Protection Plan in 2006, as required by the Montana Department of Natural Resources and Conservation as part of state law, map has been revised several times. A 2008 map was rejected because residents objected to their properties being shown in WUI areas for fear of impacts on their insurance and property values. The county returned to an older WUI map and decided to promote Firewise education rather than pursue regulations for homes in WUI areas.

Chief Knapp says that Ravalli County is a long way from getting people who live in the interface to realize that they need to have defensible space. He speculates that the expense of fuel treatments and special building materials accounts for some of the resistance. Another factor is the volunteer status of the county's fire departments, which lack the time necessary to raise awareness about fire risk in the community. He also notes that it is hard to get the community interested in the topic because they think it will not happen to them—until there is a fire in their neighborhood.

Policy

Given Missoula County's progressive reputation, and Ravalli County's reputation as a libertarian stronghold, we were interested to investigate the extent of the differences between the two counties' attitudes toward wildfires. Instead we found that the policies in place are almost indistinguishable. Perhaps more than anything, this points out just how difficult it is—as the other case studies also highlight—to enact systemic fire safety standards.

Montana state law requires that the Department of Natural Resources and Conservation adopt "best practices for development within the WUI and criteria for providing grant and loan assistance to local government entities to encourage them to adopt those practices."[37] The initial intention was to create WUI regulations that would be applied statewide, but resistance, especially in Ravalli County, dissolved the project. Instead of regulations, the state produced voluntary guidelines, or recommendations, that can be incorporated into local subdivision regulations if counties chose.

The fires in 2000 spurred the state legislature to expand what counties were allowed to regulate under the guise of public health and safety. Since then, both Ravalli and Missoula counties have adopted fire safety standards for subdivisions. Missoula County requires subdivisions within the Wildland Residential Interface (WRI) to comply with defensible space and roof material standards, among others, based on the state guidelines and modified with additions from the fire department. Individuals building on their own land are not required to do anything, but fire departments make recommendations about water supply and defensible space. The county Comprehensive Plan's growth policy addresses health and safety in WUI, but in Montana, growth policy cannot be used as a regulatory tool.

Missoula County is preparing to revise the Community Wildfire Protection Plan (CWPP), and is in the process of revising the subdivision code. Parts of the CWPP will be integrated into the subdivision code, but they will likely only appear as recommendations.

[37] See http://dnrc.mt.gov/forestry/Fire/WUI/Documents/GuidelinesFINAL.pdf.

Pat O'Herren, a senior planner for Missoula County, comments that landowners present intense opposition to regulations, with arguments ranging from "I love my Ponderosa Pines" to "This is part of the United Nations trying to force us off our land"—and sincerely believe it. Currently, landowners in the Double Arrow Ranch subdivision are strongly resisting a rural zoning project that would establish WUI building standards.

In Ravalli County, the subdivision code outlines defensible space, fuel break, and access requirements for homes in "high fire hazard" areas. The Planning Department determines whether or not a subdivision is in a high fire hazard zone.[38] The county has not adopted the general ICC fire code. Just the basics—only about five percent of the code—were included in the subdivision regulations.

The number of inspections that ICC code would require would overwhelm the volunteer fire departments, according to Chief Knapp. He describes the lack of paid employees being hard on the fire service; it is a huge burden to maintain such a high level of service, particularly given the number of wildland fires each year and the travel they require (volunteers go to other counties in Montana as well; and, except in the city of Hamilton, the fire departments also provide medical service). He believes volunteer service will not be sustainable for much longer and that taxpayers will eventually have to "step up to the plate" to fund paid firefighters. They then may also realize that they need to do more in terms of fire prevention.

Neither Missoula nor Ravalli counties have any requirements that apply to existing development, but both have active Firewise programs. In Ravalli County, Bitterroot Resource Conservation and Development administers grants for fuel treatment on private land and is active in community education about fire risk. Homeowners have been aggressive in implementing Firewise principles, according to Commissioner Greg Chilcott.

In Missoula County, the Office of Emergency Management does fuel mitigation work, encourages private landowners to implement Firewise principles, and administers grants to assist with the cost. Title III money, often in the form of cost share grants, goes to fire prevention, and there are always more applicants than there is money available.[39] While people want to live in remote areas, they often do not recognize that because resources are further away than they would be in an urban area, they have to create defensible space around their homes. The county has two Firewise communities that meet the required building material, defensible space, and water supply standards. Homeowners associations are responsible for enforcing the regulations.

Residents in both counties are averse to regulations. Regulations do not "go over well" in Ravalli County, says Chief Knapp. Many residents respond to the idea of regulations on fire safety standards the way they did to the idea of a drought advisory board in 2000: "We've been dealing with this for years—we'll let you know if we need you." The county also has no requirement for a building permit for individual homes (only a plumbing and electrical permit, which is required by the state). The county

[38] Ravalli County Subdivision Regulations. Available at: http://www.rc.mt.gov/content/planning/documents/SRR/finalpdfwithlinks9512.

[39] Title III funding is part of the Secure Rural Schools and Community Self-Determination Act (SRS). The future of SRS remains in question as Congress has been willing to approve only one year extensions, usually at reduced funding levels.

does not require burn permits either, which makes the idea of WUI regulations seem "pretty far down the road," according to Chief Knapp.

In Missoula County, Planner Pat O'Herren says that focusing on saving lives—of residents and firefighters—through taking preventative action would be more effective than instituting regulations to enforce compliance. Chris Lounsbery of the Office of Emergency Management concurs with the aversion to regulatory action, but he notes that Missoula is the most likely of all Montana counties to consider implementing stronger regulations.

Missoula County is in the process of developing a long-range plan to address wildfire hazards. The idea of zoning restrictions in WUI areas has surfaced, but is not popular given the hesitancy to regulate what people can do on private property. Today, most of Missoula County is not zoned. The 2005 CWPP noted that while the community fire planning process "has generated discussion about more regulations…at this time, project leaders endorse the idea of not prohibiting land use and building/development in Missoula County. Rather, they encourage the adoption/execution of known guidelines/Firewise suggestions."[40]

Pat O'Herren thinks that increasing the cost burden on communities might be an effective way to change regulatory policy. He referred to the Bitterroot National Forest's recent statement that they cannot continue to protect homes in wildland fires as they have done in the past.

Rick Flock of the Bitterroot National Forest clarified the Forest Service position. The Forest Service is not responsible for structure suppression, which specifically refers to firefighting when a structure is already on fire. The Forest Service is not trained to put out structure fires. Rural fire districts do this, though the Forest Service may support them by supplying water to their tanks or helping in other ways. Historically, when large fires threatened homes, the Forest Service would spend a lot of money cleaning gutters, setting up sprinklers, and moving woodpiles, etc., although it is not their job (or that of rural fire districts), but of the homeowner. Forest Service crews are hired to protect the National Forest, not private homes. They do have agreements with other fire agencies—federal, state, and county—to assist in firefighting. So while policy has not changed, practice is changing, as the Forest Service does not consider structure protection an appropriate expenditure of federal taxpayer dollars.

In the Bitterroot Valley (Ravalli County), the Forest Service has agreements to protect state and private land. In other counties, depending on the ratio of state and federal land, the state may protect National Forest land. (For example, Ravalli County is 73 percent National Forest, so that federal agency takes on the protection of other land; in Missoula County, land ownership is more diverse, with a greater mix of private, state, and federal.) The Forest Service also has agreements with counties that allow for up to four hours of firefighting at no cost; after four hours, counties must reimburse the Forest Service, and vice versa, for counties that assist the Forest Service.[41]

Chief Knapp in Ravalli County believes people would be more open to regulations if they were more responsible for costs, but he sees the crux of the problem in the National Forests. "Private landowners do

[40] Missoula County CWPP, 2005. Available at: http://www.co.missoula.mt.us/oes/plans/.

[41] This policy differs around the nation. In California, for comparison, there is no cost for the first 24 hours of assistance: http://www.lao.ca.gov/2005/fire_protection/051205_fire_protection.htm.

a pretty good job," he says, though there is still a lot of work to be done. But since most fires do not start on private land, the real issues, he believes, are poor forest management, no logging, beetle kill, and drier weather patterns. Landowners who are participating in grant programs to do fuel reduction on their own land are irritated by the amount of work that needs to be done in the forests.

The frustration comes from many sources and perspectives. Rick Flock, from the Bitterroot National Forest, expresses frustration with the lack of incentives for regulation on development and also the lack of penalties for counties that allow irresponsible development. At the same time, a local county official, while recognizing that the money the Forest Service spends on suppression means less is available for prevention, expresses frustration that the Forest Service would decrease both logging and fire suppression efforts.

In addition to the budget cuts that eat away at the Forest Service's ability to do fire prevention, the biggest problem is that fires *need* to burn, and the Forest Service is not able to let them because of development pressing up against the forests. As soon as a fire gets close to a WUI area, he explains, the helicopters are called in and fire suppression goes all out—which also means most of the money is spent on protecting WUI areas.

Chief Knapp is also well aware of the conundrum of letting fires burn for natural benefits—when the Forest Service believes that a fire will not be a problem to the public, they monitor it while letting it burn. But doing so runs the risk that weather patterns change and the fire endangers lives and/or homes. Because of these restrictions, creating an adequate buffer between private land and National Forest land is especially difficult. Under any circumstances, clearing a buffer zone is a never-ending cycle, as the forest keeps growing.

Rick Flock from the Bitterroot National Forest emphasizes that the ecosystems of the western U.S. are dependent on fire. "If you screw them up, you're going to have bad fires." The forest plan for each National Forest includes language that allows fires to burn, except those around recreation areas, which are the only ones they are required to extinguish. In the past, the Forest Service has gone to extremes to put out more fires, but as costs are going up, and as the problems with decades of not letting fires burn become clearer every day, the Forest Service is changing how they do fire protection.

Lessons Learned

- Neither county has significant funding and relies on volunteers.
- Opposition to regulations is strong and there is little to no political will to counter this. Even when county planning officials see the importance of incorporating land use regulations to improve fire safety, they are largely unable to do so in counties where residents oppose regulations of any sort.
- Many residents, despite recent fires, do not see significant risks to their own homes from future wildfires.
- Federal and local jurisdictions, while they share costs of suppression, are not cooperating to improve education and reduce future suppression costs.
- One step that adjacent National Forests could take would be to reconsider and educate county residents about their structure protection practices and the Forest Service's policy of prioritizing forest land and fuels treatment over structure protection.
- Higher local sharing of wildfire suppression costs could be a solution.

Resources

Pat O'Herren, Chief Planning Officer, Missoula County, (406) 258-4981
Chris Lounsbery, Director, Office of Emergency Management, Missoula County, (406) 258-4469
Greg Chilcott, Ravalli County Commissioner, (406) 375-6502
Jim Knapp, Fire Chief, Corvalis Rural District, Ravalli County, (406) 360-4371
Rick Flock, Bitterroot National Forest, (406) 363-7100

XIV. CITY OF JACKSON IN TETON COUNTY, WYOMING

Background

Two large fires burned near Jackson, Wyoming in recent years. In 2001, the Green Knoll fire burned more than 2,000 acres and threatened about 200 homes in two subdivisions, forcing the evacuation of 300 people. In 2012, the Horsethief Fire started as a brush fire on private land five miles south of the town of Jackson.[42] The fire spread into the Bridger-Teton National Forest, headed north, and began to descend toward Cache Canyon, threatening Jackson. A change in the weather and wind helped firefighters and, at the last moment, the fire was kept from spreading into the community. The fire burned more than 3,000 acres and cost more than $9 million to control. No structures were lost during either fire.

Teton County, Wyoming

- Population: 21,675
- Total county acreage: 2,681,589
  - Private: 186,680 acres, 7%
  - State: 6,934 acres, 0.3%
  - Federal: 2,487,976 acres, 93% (mostly FS and NPS)
  - Forested: 1,206,715 acres, 45%
- WUI size: 42 square miles
  - Developed: 4 sq. miles, 9%
  - Not developed: 38 sq. miles, 91%
  - Homes in WUI: 2,948 homes, 23% of total homes
  - Second homes in WUI: 888 homes, 30% of WUI homes

According to Kathy Clay, Jackson Fire/EMS fire marshal, the city encourages citizens to do all they can to minimize their risk, but "homeowner apathy is the number one enemy." Residents leave flammable furniture on decks, and many refuse to thin vegetation and create defensible space around their homes. When the fire department and other fire agencies hosted an all-day educational event for landowners on how to minimize fire danger, only three members of the public attended. A sense of entitlement also impedes action: "Because people are so wealthy here, they expect services and they expect firefighters to come save them."

In addition, past successes in keeping large fires from burning any structures has led to a sense of invulnerability and the perception that the rapid deployment of firefighting resources, including helicopters and planes, will stop future wildfires before they reach homes. The wealth of many residents, and their political influence, contributes to this sense of imperviousness.

In Jackson, unlike other communities, insurance policies for homes in the WUI can function as an obstacle to persuading landowners to create defensible space around their homes. Jeff Daugherty, county planner for Teton County, described how, after the Green Knoll fire, insurance companies reimbursed some landowners significant amounts of money for the trees that burned on their property, which had

[42] Inci Web Incident Information System. Horsethief Canyon. http://inciweb.org/incident/3241/ ; Teton Interagency Fire, Wildfire Information. http://gacc.nifc.gov/egbc/dispatch/wy-tdc/wildland-fires.html . Horsethief Fire Threatens Jackson, Wyoming. http://www.youtube.com/watch?v=xHxQ9g39mLQ.

been insured as "landscaping." These payments created a strong disincentive to cut down trees, frustrating efforts to educate landowners on the benefits of fuel reduction and defensible space.[43]

The fire department has indicated that they consider some developments—for example, those with only one road in and out—to be "suicide subdivisions" where they will not enter to fight fires: "If we can defend your home we will, but if it is too dangerous, we won't." Some subdivisions have poor access, with only one road in and out. The fire chief has made it clear that if this subdivision burns, the fire department will not defend it.

Policy

Teton County makes concerted efforts to educate landowners and encourage voluntary standards. It also benefits from excellent coordination between city, county, state, and federal agencies, according to the fire marshal. Yet the community has few official regulations to minimize risk and future development on dangerous lands.

The ICC's WUI codes are the primary vehicle for fire safety. The fire marshal can disallow new construction, if it does not meet the code, by not signing the final certificate of occupancy. Though the ICC WUI code can prevent individual buildings, for the most part it has not worked to curtail development.

While the potential for new subdivisions is not high, says Daugherty, more individual homes are likely, and they will be expensive to defend. Since the ICC WUI code (or any other wildland fire policy) does not apply to existing structures, Daugherty emphasizes that fire education needs to be directed primarily at existing structures. One of the challenges facing Teton County is that many homes do not have adequate water (fire hydrants) nearby and there are insufficient funds to monitor compliance for those subdivisions where water availability is required.

The Bridger-Teton National Forest, like many other National Forests, is trying to concentrate on fighting fires in the forest, after many years of devoting significant resources to protecting homes. "We don't have any training in structure protection," says Dale Deiter, of the Jackson Ranger District, Bridger-Teton National Forest, and he adds that protecting homes is not the responsibility of the Forest Service.

A recent agreement between local and federal agencies allows the Forest Service to focus on fighting fires in the forest, while others defend structures. "We turn our sprinklers towards the forest, they turn theirs towards houses." This type of coordination between firefighting entities at different levels of government is critical, which means building relationships and gaining trust. "It's an art as much as a policy," says Deiter.

In addition to signing a cost-share agreement between the Forest Service and city, county, and state agencies ahead of time, Dale says it is also critical to involve the other entities on important decisions "in the heat of the battle." For example, if the Forest Service orders plane drops without first informing the county and agreeing to a cost share, then it is difficult to retroactively ask the county to share the

[43] While not verified, several people interviewed in Teton County estimated that landowners received $5,000-$10,000 for every tree that was burned.

costs. Forcing the counties to pay is not realistic, he says, because that would lead to a poor long-term relationship, making shared costs and responsibilities more difficult in the future.

Despite the agreement that allows the Bridger-Teton National Forest to focus on fighting fires in the forest, much fire suppression by the federal agency still is intended to keep the fire from spreading towards structures. So the Forest Service still does WUI-related firefighting, even though it may be further in the backcountry.

Restricting building on fire-prone lands in Teton County would draw significant opposition, according to the fire marshal. Federal land makes up 96 percent of the county, and little remaining private land is developable. The land that is available is very expensive. "The opposition to not building would be intense because people here spent a lot of money on their land."

Lessons Learned

- Strong coordination among the various local, county, state and federal agencies has improved fire suppression effectiveness.
- Such coordination now could focus on educating homeowners of the federal government's priorities (forest health rather than structures) and of the local agencies view toward "suicide subdivisions."
- Efforts are hampered by past success in fighting fires—due both to aggressive early firefighting as well as lucky changes in weather patterns—that has also made fire prevention efforts more difficult to implement, as many residents have become complacent.
- Even with the resources available to enforce regulations and to employ a fire marshal, Jackson has not taken pro-active steps to enact fire prevention standards that would restrict development in fire-prone areas, due to strong opposition from residents, and a sense that particularly with the high cost and limited availability of land, private property rights should not be curtailed.

Resources

Kathy Clay, Fire Marshal, (307) 733-4732
Jeff Daugherty, County Planning Director, (307) 733-3959;
Dale Deiter, District Ranger, Jackson Ranger District, Bridger-Teton National Forest, 307-739-5400
Teton County, Jackson Hole Fire/EMS Wildland Urban Interface Information
http://www.tetonwyo.org/fire/topics/-wildland-urban-interface-information/251210/

XV. CITY OF SANTA FE IN SANTA FE COUNTY, NEW MEXICO

Background

The City of Santa Fe is at relatively high elevation with the surrounding area ranging from nearly 6,000 feet to 9,400 feet, which is predominantly pinon/juniper forest land. The City shares fire suppression responsibility with the surrounding namesake county, as was well as the U.S. Forest Service and the New Mexico State Forestry Division.

The region has had a series of forest fires that have shaped policy toward the City's watershed and future homebuilding. The first wildfire of note was the Cerro Grande fire of 2000, a controlled burn that started within the Bandelier National Monument near Los Alamos, New Mexico. The fire—due to high winds and drought conditions—escaped its planned boundary, resulting in 48,000 acres of fire damage and causing more than $1 billion in damages. The fire costs could have been considerably higher from flooding and damage to the watershed, but temporary dams and a relatively light monsoon season that summer resulted in significant erosion to canyon bottoms and trails but not structures.

Santa Fe County, New Mexico

- Population: 146,375
- Total county acreage: 1,211,550 acres
  - Private: 716,910 acres, 59%
  - State: 75,889 acres, 6%
  - Federal: 315,868 acres, 26%
  - Forested: 157,502 acres, 13%
- WUI size: 18 square miles
  - Developed: 6 sq. miles, 34%
  - Not developed: 12 sq. miles, 66%
  - Homes in WUI: 2,021 homes, 3% of total homes
  - Second homes in WUI: 386 homes, 19% of WUI homes

In 2011, two fires struck the region. The first, the Pacheco Fire, began on June 18 that year and threatened the Santa Fe Watershed as well as the Santa Fe Ski Area while burning more than 10,000 acres.

While the Pacheco Fire was still uncontained, the Las Conchas Fire started on June 26 in the Santa Fe National Forest and burned more than 150,000 acres, threatening Los Alamos and the nearby National Laboratory. After five days of burning, it became the largest wildfire in New Mexico state history at the time. Although neither of these two fires in 2011 burned within the City of Santa Fe, residents were affected by smoke and the economic impact to tourism and the closing of Los Alamos National Laboratory, one of the larger employers in the region.

In addition to protecting homes and lives, concern about Santa Fe's watershed has driven many of the fire mitigation efforts. The watershed is just more than 17,000 acres, located within the Santa Fe National Forest. The area has been closed to the public since 1932, with an updated "special prohibition" issued by the Forest Service in 1991.

The watershed is the home of the City's two reservoirs and provides more than one-third of the annual drinking water supply. City plans estimate that fire and sediment damage would significantly impair the reservoirs for a significant amount of time, stating that it would be expected to cost up to $240 million and take ten years to rehabilitate the watershed after a significant fire.

The City also is concerned about land that it may annex in the future. While most of the fire-prone lands near the City already have been built, staff estimates that undeveloped county areas that could become part of the City in the near future would represent roughly 2,000-3,000 developable lots.

In 2013, Santa Fe drafted a hazardous mitigation plan agreement, the "Multi-Jurisdictional Hazard Mitigation Plan for Santa Fe, New Mexico," to update its 2008 plan and submitted it at the end of the year to the Federal Emergency Management Agency (FEMA) for final approval.

Concerning future fire risks, the plan notes:

> "Forestland in the surrounding Santa Fe County is extremely susceptible to wildfires due to dense timber stands and recent drought conditions. The higher than normal tree densities and accumulation of fuels present a significant, continued threat of wildfire to structures located in the wildland-urban interface area. Much of the City's water comes from the Santa Fe Watershed located within the forest."[44]

Policy

The City has initiated a number of steps to improve the safety of both its watershed and residential homes. In 2001, Santa Fe residents and staff, concerned that a fire near its watershed could result in significant damages, started a project to protect the City's drinking water, including an expected $7 million worth of mitigation work around the watershed designed to make the area more resilient to fires, potential sediment runs, and other aftereffects from a wildfire. The work included treating ponderosa pine at higher elevations.

By 2009, much of this work—predominantly on Forest Service land—was completed for roughly $8 million. In 2013, a revised plan for the watershed called for more thinning over the next fifteen years, at an additional cost of $5 million, with most of the funding coming from Santa Fe households that utilize the water.

Looking at the residential risk of wildland fire, unlike many other jurisdictions reviewed for this paper, Santa Fe has several staff dedicated specifically to WUI safety efforts. In 2006, Santa Fe commissioned a thorough study of its surrounding WUI lands and the hazards and risks found in those areas. The study includes a history of fire in the region, risk evaluations, and extensive mapping; while outlining a series of steps for mitigation and other Firewise-type activities.

In 2009, the City adopted the International Fire Code (IFC) for buildings and grounds within the WUI (the county already has a similar code and has adopted its own Community Wildfire Protection Plan or CWPP in 2008). City staff helped drive adoption of the international code and grandfathering of existing structures helped smooth its adoption.

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[44] Multi-Jurisdictional Hazard Mitigation Plan for Santa Fe, New Mexico is available at: http://www.santafenm.gov/hazard_mitigation_plan_1.

In addition, the draft 2013 hazard mitigation plan has many positives aspects such as building on inter-jurisdictional government cooperation, encouraging more public education and awareness of risk, and laying the groundwork for possible future funding requests or policy updates.

On a more cautious note, while Santa Fe follows Firewise principles, it is not a certified community and significant amounts of mitigation work remains to be done. For example, since 2009 the City has been doing parcel level assessments of risk. All told, roughly 10,000 parcels are at risk but only 250 have been completed for fuels reduction and inspection. The City is working with homeowners associations (HOAs) to encourage voluntary participation.

The City hopes to greatly increase mitigation work in the coming years. Santa Fe staff believe that most residents appreciate the risk of future fires, and experience support from other nearby homeowners. Most importantly, the City is providing the work for free, although the funding stream is variable to support the hand crews that do this work and they often have been available for only six months of the year.

That said, the City still does not require mitigation work and the pace would have to increase exponentially to cover even half of the current parcels at risk; and not accounting for future annexations of at-risk land or the need to follow up or repeat mitigation on lots treated in previous years.

Lessons Learned

- Santa Fe is doing a number of things well. Compared to other jurisdictions, the City has significant resources to use toward increasing fire safety—for example it has several WUI experts on staff. The City also has a relatively high level of cooperation with the surrounding county, state and federal agencies, and it has undertaken several studies that map and document fire hazards and risks, while laying out ambitious plans for work in the watershed and around residences.
- That said, an enormous amount of work remains to be done to protect existing homes, and it's hard to fathom how a significant portion of existing residences will be protected given the current pace of progress.
- In addition, while the City has dedicated staff on its payroll, it so far has not allocated a significant level of its own resources to increase the mitigation work it itself has documented as necessary.
- The experience of other communities also shows that it is exceedingly difficult to be continually fire safe as homes require constant work and vigilance as the fuel load keeps growing.
- Even in a City as well-funded as Santa Fe additional incentives, or sticks, at the state or federal level may be necessary for the City to find the resources or political will necessary to make itself safer from wildfires.

Resources

Dale Lyons, formerly with the Santa Fe Water Division, has since moved to The Nature Conservancy, 505-946-2027
Gregory Gallegos, WUI Superintendent, 505-955-3120

Porfirio Chavarria, WUI Specialist, 505-955-3119
Santa Fe's 2006 wildfire risk assessment: http://www.santafenm.gov/document_center/document/899
Draft 2013 City of Santa Fe Hazard
Mitigation Plan: http://www.santafenm.gov/document_center/document/820


HEADWATERS
ECONOMICS