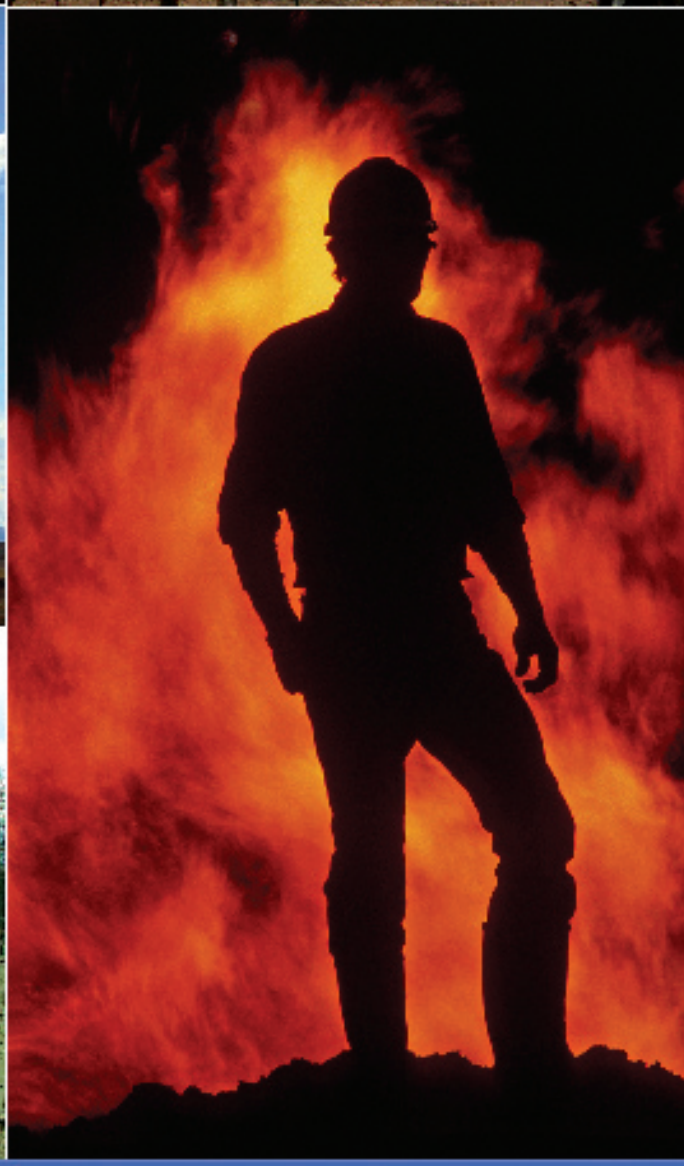
The Phoenix Guide



A handbook for watershed and community wildland fire recovery

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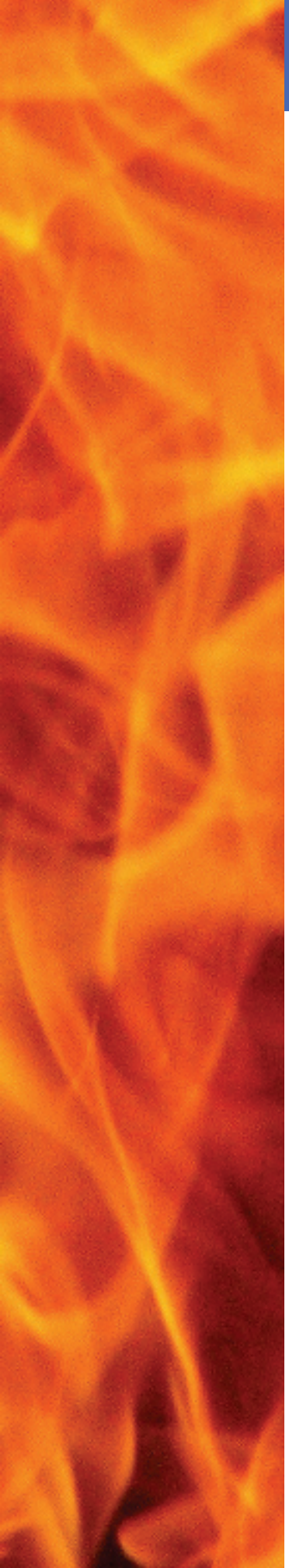
The following organizations and individuals contributed to the guide: Karen Berry and Sally Lobel, Jefferson Conservation District; Jonathan Bruno and Carol Ekarius, Coalition for the Upper South Platte; Ed ward Spence and Herman Garcia, Natural Resources Conservation Service; Sean Cronin, freelance writer; Trinity RCD, CA; Western Shasta RCD, CA; Missoula Conservation District; Ciudad SWCD, New Mexico; San Diego Fire Safe Council; RCD of Greater South Dakota; Bitterroot RCD, MT; Deb Bogar, Urban, Community and Coastal Resources Committee, National Association of Conservation Districts.



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This Handbook is intended to provide Conservation Districts, nonprofit groups, and communities with a step-by-step guide to use in developing a post-fire recovery and re-habilitation plan.

Getting Started:

Introduction To The Guide

After a catastrophic wildfire, quick action must be taken to minimize social, environmental, and economic devastation. Responsive action requires navigating a complex maze of diverse landowners, community organizations, and numerous local and federal requirements.

This Handbook is intended to provide Conservation Districts, nonprofit groups, and communities with a step-by-step guide to use in developing a post-fire recovery and rehabilitation plan. It addresses, with examples and resource materials, issues such as who to involve in developing a plan, how to engage other interested parties, what elements to consider in assessing post-fire risks and priorities, and how to develop a mitigation or recovery plan to address those risks. We hope it will prove useful in helping your community establish plans and priorities that protect its citizens, homes, and essential infrastructure and resources from the destruction that can occur after a catastrophic wildfire.

Approach

This handbook was primarily compiled from the experiences of individuals, groups, and communities that have been impacted by recent large wildfires (over 60,000 acres). Gathered from personal interviews and questionnaires, the lessons learned from different fires and communities are a key part of the handbook.

Resource materials, from a wide variety of local, state and federal sources, are highlighted in the main part of the handbook, and selected resources are included in the appendices.

What's in the Handbook

Impacts of Fire: Social, Economic, and Environmental

After smoke clears and the incident command center is closed, a fire continues to filter through a community for years-risks still remain and the work is far from over. This section of the handbook deals with the social, economic, and environmental effects of fire.

Before the Fire: What Can You Do to Be Ready

Planning, before fire, is critical to the survival of a community during and after a fire. In this chapter discussions focus on the creation of fire plans, partnerships, resource identification, and homeowner preparedness.

Community Engagement: Building Relationships

Public outreach, before, during, and after a fire is the key to success; examples of outreach strategies and community assistance centers are included in this section.

The Recovery Process: Immediately After the Fire

After a fire, damages are assessed, and recovery plans created for protection of environmental and community resources. This process can differ on private and public lands and is outlined in this section.

Towards Recovery: Organizing and Utilizing Volunteers

Most federal programs assist in short-term stabilization but do not provide resources for long-term rehabilitation. This section discusses how Conservation Districts, and local organizations can aid in community recovery by organizing volunteers and obtaining funding for long-term rehabilitation.

Restore Landscapes and Rebuild Communities

Just because the BAER teams have finished does not mean that recovery is complete. This part of the handbook describes the gaps, hazards, and challenges of long-term recovery with examples, lessons and resources. Information on flooding, mud flows, noxious weeds, timber salvage, rehabilitation methods, insects and other post-fire issues are included in this section.

Liability : Volunteer Protection and Good Samaritan Laws

This section includes a discussion of Volunteer Protection and Good Samaritan laws for volunteers, licensed professionals and nonprofit groups. Risk management and insurance issues are also discussed.

Grants: Funding Recovery Efforts

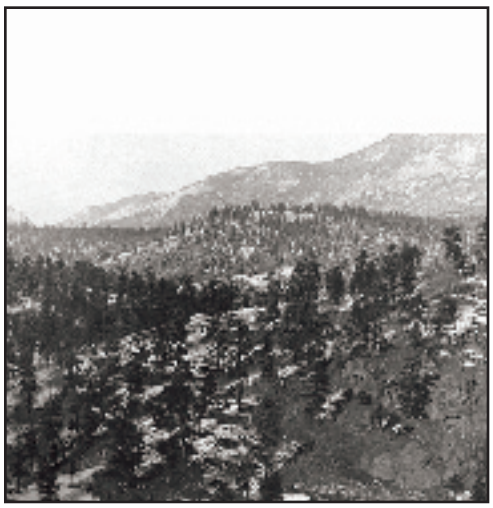
A list of grant sources for environmental and community rehabilitation following fire.

Appendices
Resource materials, additional information, sample forms, and specification sheets for rehabilitation work.

Introduction

The annual acreage consumed by wildfires in the lower 48 states dropped from 40 to 50 million acres a year in the early 1930s to about 5 million acres in the 1970s. However, in recent years, catastrophic wildfires have broken decades-old records.

The intensity of recent fires is a result of severe drought, and the long-term effects of more than a century of aggressively suppressing all wildfires, which has led to an unnatural buildup of brush and small trees in our forests and rangelands.



1906, Low-density forest with diverse landscape structure and openings. Photo by the Colorado State Forest Service.

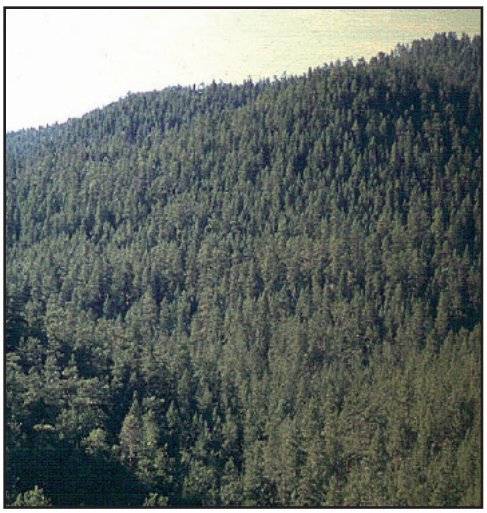


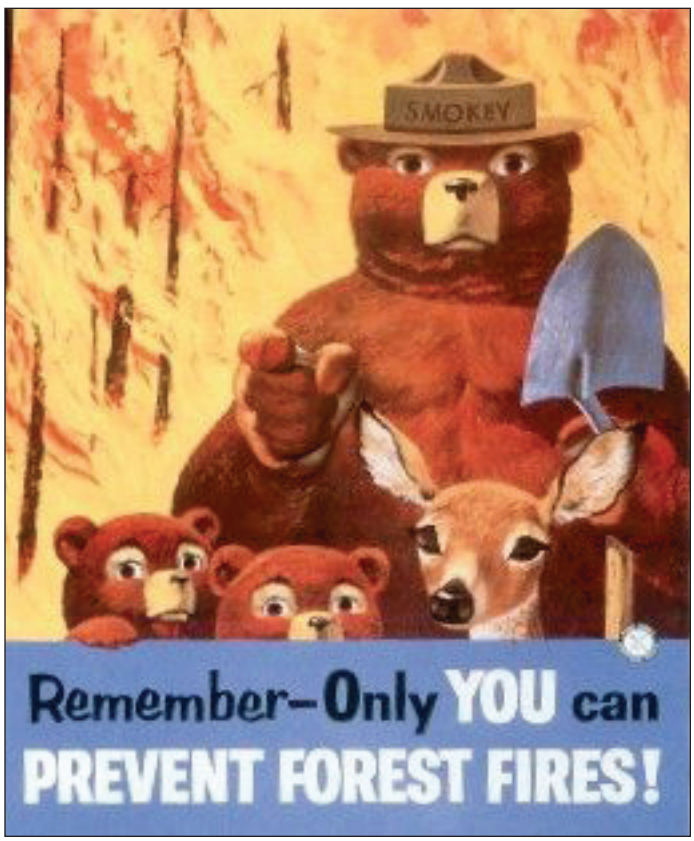
Photo of the same area 100 years later; shows a dense and uniform forest, susceptible to insect epidemics, and vulnerable to crown fires. Photo by the Colorado State Forest Service.

In addition to unnatural fuel buildup, management of forests and rangelands has become more complex in the last two decades due to dramatic increases in the West's population (USDA, 2000).

Native Americans used fire to alter vegetation patterns, and increase productivity of hunting grounds

Brief History of Fire and Land Use

Before European settlement, Native Americans used fire to alter vegetation patterns, and increase productivity of hunting grounds. Fire and people co-existed. After settlement of North America, human relationship with fire changed dramatically. Fire, not well understood, considered an enemy, was aggressively controlled. Fire was thought to destroy forests, savannahs, shrub lands, and grasslands. The destructive and deadly side of fire was the key factor used in managing this natural phenomenon. Because of active suppression, changes and risks, resulting from excluding natural fire, were difficult to recognize, mounting slowly and discreetly over many decades (USGS, 1995).



In 1937, President Roosevelt kicked off a national campaign to reduce the number of fires. The message "only you can prevent forest fires" was a powerful message for the public. Poster from U.S. Forest Service

Past land use practices, based on the assumption that all fires must be stamped out, has had undeniable negative effects upon the ecosystems of North America. Natural resource policy was also created on the notion that immediate suppression of fires would reduce overall losses.

During the New Deal, large resources were mobilized to meet large problems

– including armies of workers. Through the Works Progress Administration (WPA), the Civilian Conservation Corps went to work suppressing fires. The Forest Service put a Park Service hat on a bear cub, and sought to mobilize the public as well. Smokey Bear became the poster-cub of the successful "only you can prevent forest fires" campaign.

The exclusion of fire and land use changes have increased the amount of fuels, and altered the arrangement, structure, and composition of fuels. These changes, along with sustained drought, have increased fire intensity, spread, and resistance to control, particularly in the West. Compounding problems, are small ranchettes and urban subdivisions adjacent to or intermingled with public lands. (USDA, 2000) Recent catastrophic fires are due, in part, to the alteration of historic fire regimes.

Fire Facts

Fighting fires cost money in terms of manpower, equipment, and support systems. For example:

- 2004 - $790 million
- 2002 - $1 billion
- 2001 - $607 million
- 2000 - $1.26 billion

For the 21st century, some acreage burned totals are:

- 2004 - 8.0 million acres
- 2002 - 7.2 million acres
- 2001 - 3.6 million acres
- 2000 - 8.4 million acres

In 2003, almost 58,000 fires burned nearly 4 million acres in the United States. The majority of the big fires occurred in drought-stricken Western states: Arizona, California, Colorado, Montana, New Mexico, Oregon, and Washington. After a wildland fire, post-fire devastation, extending well beyond the fire area, impacts lives and property, wildlife habitat, soil, and water.

Given favorable weather conditions, forest structure, fuel overload, and other

The Peshtigo tragedy served as a deadly warning about what can happen when forest health is badly compromised

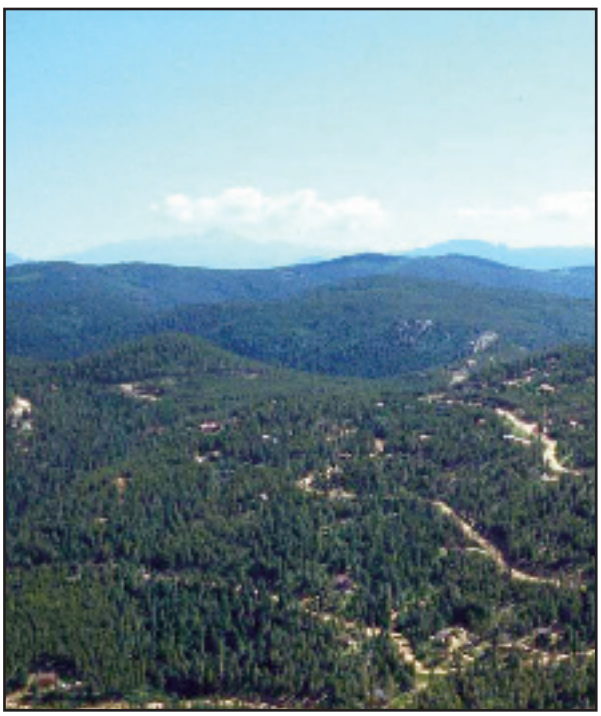
factors, the number of wildland fires has been growing, getting larger, and gaining in intensity.

Economic damages in affected communities due to wildland fires are also enormous in terms of burned structures, business losses, and missed recreational opportunities. Of late, damages run into hundreds of million of dollars.

Source: U.S. Forest Service, Fire and Fuels Quick Facts, 2004

The Peshtigo Tragedy

Natural fire patterns were first disrupted on a large scale with settlement activity during the second half of the 19th century when millions of acres of forests and rangelands were cleared to make way for crops and livestock pastures. During this time, timber companies often took the biggest trees, leaving behind slash, undergrowth and smaller trees. These activities set the stage for disastrous fires.



For those wanting a rural lifestyle, the urban/wildland interface is an attractive place to live. Yet, natural processes, such as fire, are seldom understood or taken into consideration by those who develop or live in the interface.

Fire fighting and post-fire recovery tactics differ considerably for the WUI than for undeveloped areas

More than 34,085,106 people live within WUI areas.

One of the most significant examples of this phenomenon occurred in 1871 in Peshtigo, Wisconsin, near the Great Lakes. The area around Peshtigo, mostly private land, had been extensively logged. Merchantable timber was removed; slash and dense undergrowth were left behind. On October 8, 1871, a brush fire quickly erupted into an inferno, consuming Peshtigo in an hour and damaging 16 other towns and more than 1.2 million acres.

The human toll -more than 1,200 people killed -- stands as the worst wildfire disaster in U.S. history. The Peshtigo tragedy served as a deadly warning about what can happen when forest health is badly compromised -- in this case, by logging activities. In fact, Peshtigo represented the beginning of new fire cycle throughout the Great Lakes region that would not be broken for more than 50 years."

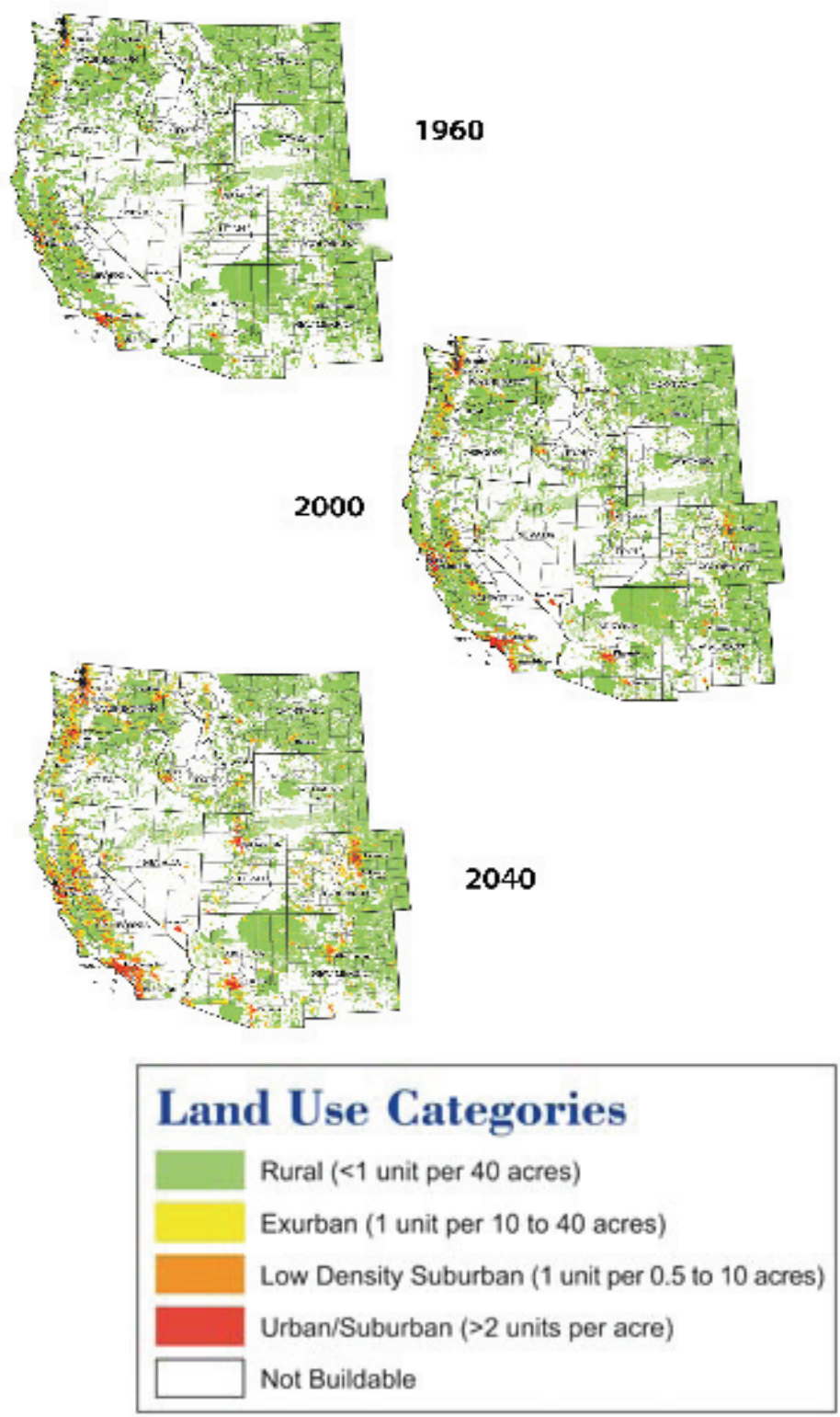
Sources: USDA, 2000 and Green Bay Press-Gazette Web Page.

The Changing West

Of the 10 fastest-growing states in the U.S., eight are in the interior West. While the national average annual population growth is about one percent, the West has growth rates ranging from 2.5 to 13 percent. As a result, new development is occurring in fire-prone areas, often adjacent to Federal land, creating a "wildland-urban interface" (WUI) -- an area where structures and other human development meets or intermingles with undeveloped wildland. This relatively new phenomenon means that more communities and structures are threatened by fire and post-fire hazards. Consequently, fire fighting, post-fire stabilization and rehabilitation have become more complicated, expensive, and dangerous.

As many people move from the fast paced city to escape to the serenity of the surrounding mountains the risks grow greater. The migration from city to country has tripled the amount of land devoted to suburbia since 1950 (Ball 1997). The migration into states such as Arizona, Colorado, Utah, and Nevada is unprecedented. But these states also are among the driest and most fire-prone in the nation. Wyoming, Montana, New Mexico and Idaho are also fire-prone states experiencing states rapid growth. There are more than 34,085,106 people living within WUI areas (USGS, 1997).

Development in the WUI is growing. In the Western U.S. alone, 38% of new home construction is adjacent to or intermixed with the WUI. 8.4 million new homes were added to the WUI during the 1990s.



Source: Center for the American West

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Hayman Fire Quick Facts

Location:
Pike-San Isabel National Forest, 30 miles south-west of Denver, Colorado.

Cause:
Human (arson).

Area within fire perimeter:
137, 750 acres.

Structures lost:
133 homes, 1 commercial building and 466 outbuildings.

Ownership:
72% National Forest.

Impacts of Wildfire

Social, Economic, and Environmental

The 2002 fire season was one of the biggest of the past half-century. By the end of year, fires consumed 7.2 million acres, costing over $1 billion to fight. Consistently, the fires of 2002 were catastrophic, but each fire, including rehabilitation efforts, was unique in character, offering individual lessons for the future.

Beginning in a camp fire circle in June, 2002, the Hayman fire would quickly grow to become the largest recorded wildfire in Colorado's history. Spurred by record drought and extreme weather, the Hayman fire burned nearly 138,000 acres. Not only was the Hayman fire the largest in Colorado history, but it was also one of the most severe with respect to burn intensity. The fire grew rapidly and burned 'hotter' destroying structures, vegetation and wildlife in its path.

"Since 2002, the Hayman Fire has dominated my life and work. Though I was not called into action until after the fire was contained, I expect that Hayman will continue to dominate my work for many years to come."
Jonathan Bruno, Operations Manager, Coalition for the Upper South Platte

This is one of the major lessons of large-scale wildfire: After the fire is out and the smoke has cleared, the impacts continue to be felt, for many years, and the work is far from over. These impacts touch on areas of our lives that most people don't think of until after they have lived through a big fire.

What are the impacts

The impacts vary somewhat from one location to the next. They are affected by fire severity, human resources in and adjacent to the burn (Wildland/Urban Interface), local ecosystem conditions (soil types, slopes, stream characteristics, etc.), and climatic conditions during and immediately following the fire. Regardless of where the fire is at, if it is a large-scale burn, the impacts fall within three general categories: social, economic, and environmental. Each of these impacts will be felt during the fire, and after.

After fire, victims and community members often suffer from a variety of mental health problems, ranging from extreme anger to serious depression.

Social Impacts

People live in the wildland/urban interface (WUI), and so large-scale fires have a dramatic social impact on communities. For example, research supported by the United States Forest Service (USFS) indicates that 8.4 million new homes were added to the WUI during the 1990s.

During the fire, residents may be forced to abandon their homes. Some may be at work when an evacuation order goes into effect; they are simply not allowed to return home, even to retrieve valuables or save their animals (pets & livestock). Family members may be separated and have difficulty finding each other.

Information is often hard to come by during this phase, leaving residents anxious and fearful. Frustration reigns and tempers flare. Evacuation orders may be enforced by local law enforcement personnel, or by National Guard personnel, giving the area a state-of-siege feeling.

In the weeks after the fire, victims and community members often suffer from a variety of mental health problems, ranging from extreme anger to serious depression. Services to victims may be strained as police, social service agencies, and nonprofits struggle to meet the needs of large groups of citizens who traditionally have not needed their services.

Economic Impacts

During a fire, and in its immediate aftermath, citizens, local governments, and businesses will suffer the double-whammy of loss of revenue coupled with unanticipated expenses. The impacts can ripple through local and personal economies for years, and are compounded by the fact that wildfires occur in areas with strong recreational and natural-resource based economies. These are the economic resources most damaged directly by the fire.

There are, of course, the obvious impacts to citizens who lose a home, but even those who don't lose their homes to the fire may feel the economic pinch. Power outages and evacuations have unexpected costs such as hotel bills or loss of perishables. Many people's jobs are lost—temporarily, or permanently. Farmers and ranchers lose crops, stored feed, or livestock. Fencing and other landowner infrastructure can be destroyed. Many citizens discover after the fire that their insurance is seriously insufficient to cover their losses, and for some who do lose their home, they are forced by their insurance to rebuild in the moonscape of the burn if they want to receive any insurance payments.

Local governments, such as fire districts, and businesses such as utilities have equipment destroyed and supplies (that were intended to last for long

periods) exhausted in a matter of days or weeks. Maintenance and operating costs for transportation systems, water supplies, and other infrastructure needs will increase, and the increase will last for years.

These same local governments are often strapped by a reduction in the assessed value of properties within their districts in the aftermath of the fire. Revenues are tied to values, so they see their funding shrink.

Healthcare costs increase for problems ranging from asthma to injuries, and heart attack to stroke, both during the fire and in the immediate months that follow it. Again, under- or uninsured citizens incur many of these costs.

Catastrophic fire usually results in a federal declaration of emergency, which brings some federal resources from agencies like FEMA, NRCS, and others to help, but these resources may not be immediately available, and the requirements to access them may be such that many citizens and entities can't readily take advantage of them. The paperwork, alone, is often a stumbling block. Some programs may be authorized by Congress, but not have actual funding available, and others may require local sponsors or landowners to provide match dollars from documentable non-federal sources.

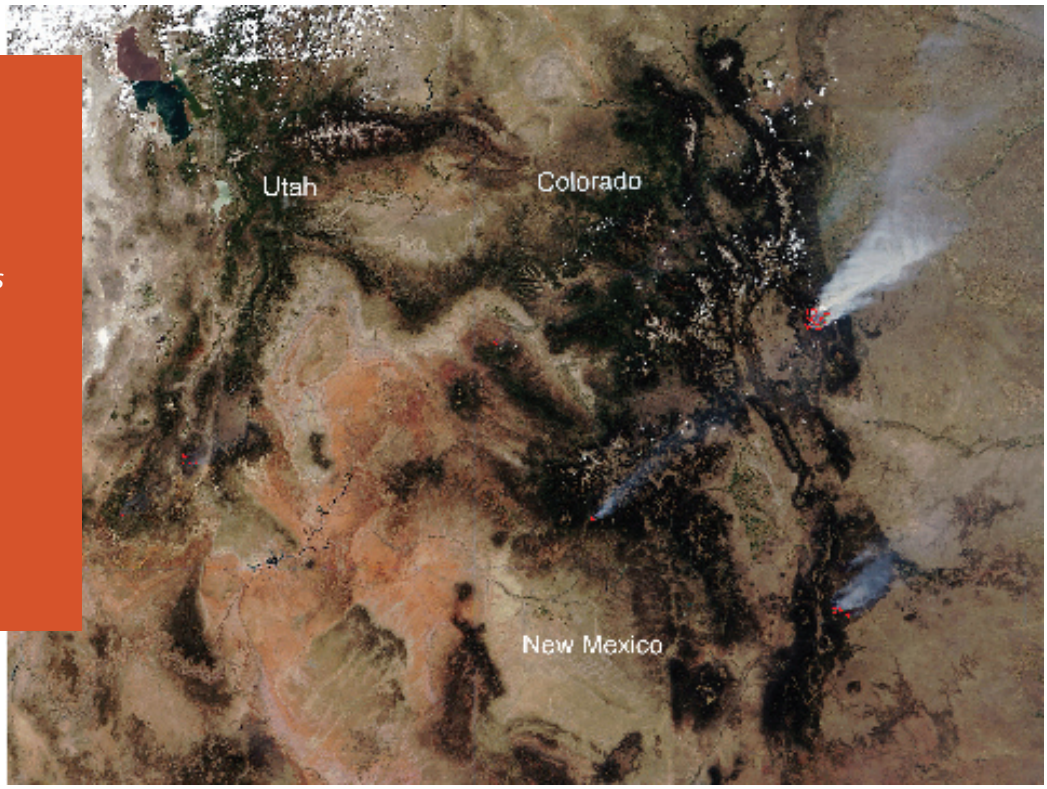
Local Economic Impacts of the Rodeo-Chediski Fire

Dallas Massey, Chairman of the White Mountain Apache Tribe in eastern Arizona summed up some of the impacts of the Rodeo-Chediski fire (2002) on his tribe in a statement he made to Congress in 2003:

Economic impacts include disruptions to both the production and consumption of goods and services, such as decreased recreation/tourism and timber harvest, as well as costs associated with evacuations and transportation delays. Direct property losses (in the form of buildings, timber, livestock, and other capital) are usually easily recognized, but long-term damage to human health and possible changes in the long-term structure of the local economy occur, yet are more difficult for area residents and officials to categorize.

Environmental Impacts

There are myriad, and sometimes unexpected, environmental impacts, and these can have some of the longest-term impacts on local communities. Worsened air quality and water quality, reductions in wildlife habitat, and hazardous waste disposal all come into play.



Large fires produce high levels of particulates and can create weather effects that reach well beyond the fire area. Ash plumes, shown in this satellite image, created thunder storms hundreds of miles from fire sources. In southwest Utah are the Big Wash and Sanford Fires. In Colorado, firefighters are battling (clockwise from top left) the Long Canyon, Hayman, and Missionary Ridge Fires. In New Mexico is the Ponil Fire.
Photo: NASA

Particulate air pollution increases dramatically during the fire (for example, the State of Colorado's Air Quality Control Division monitoring in downtown Denver showed the highest levels of particulates ever measured while the Hayman and other fires were burning in Colorado during the 2002 fire season), and there are some increases of ash/soot particulates in the weeks following a large fire as wind moves this debris from the burned area. Mercury and other contaminants that have bio-accumulated in vegetation over many decades will be released and carried in either airborne drift or as waterborne runoff, to contaminate drinking water supplies and fisheries.

Runoff (from even rather small storm events) can result in catastrophic flooding and debris flows. Colorado's 1996 Buffalo Creek fire burned 11,700 acres, though no homes or infrastructure improvements were lost to the fire. In the following months, however, flooding took two lives, destroyed a number of homes, and filled a City of Denver municipal water reservoir with sediment, ash, and other debris. The City's water department estimates that the cost to clean the reservoir out will approach 15-25 million dollars, if they can find a place to dispose of the sediment. On a smaller scale, farmers and ranchers often lose the capacity of their reservoirs to sediment flows, which are crucial to their operations for irrigation or stock watering.

Fish and wildlife are killed during the fire by heat and smoke. Then critical wildlife

habitat is destroyed—and in the case of Threatened & Endangered species, this may cause extinctions to occur. Invasive plant species often explode after the fire, as highly burned soils provide an ideal environment for them.

Burned structures and vehicles leave a hazardous-waste disposal project of sometimes-unimaginable magnitude. Household and business chemicals, batteries, asbestos, lead, and simple debris all add to the cost of cleanup.

Ash and sediment from the Buffalo Creek Fire fills a major water supply reservoir. Clean up of debris cost $900,000 and dredging costs estimated to be up to 20 million. Photo by Denver Water Board

After The Biscuit Fire

Doug Robertson, a Douglas County, Oregon, Commissioner had this to say about the economic impacts in the aftermath of the Biscuit fire:

Because of the time consuming nature of the bureaucracy that controls post-fire management in many situations, by the time the federal government has slogged through the process of determining an appropriate management action, there is nothing left to manage. Let me cite just one of many examples to amplify my point. In 1996 the Spring Fire occurred in the Umpqua National Forest. It burned approximately 17,000 acres, 11,000 of which were in a designated wilderness area. That left 6,000 acres of burned timber and landscape that could be managed. After 8 years, these 6,000 acres have become a wasteland of dead, rotting timber, and a brush field as high as this room. Immediately after the fire the dead trees represented tens of millions of dollars in value, millions of board feed of lumber for homes, hundreds of jobs, and as important as anything an opportunity to begin to recover the wildlife habitat and other environmental amenities that the public so highly values.

Conservation Districts, working with federal and local partners, can have a positive impact on the community's social and economic situation in the months and years after a fire.

Up From the Ashes

Short and Long-Term Rehabilitation

Given enough time, forests eventually heal from wildfire. But that healing process can take decades, or even centuries. They simply won't heal quickly without human intervention. Timely rehabilitation efforts reduce environmental impacts of fire, and can have a positive impact on the community's social and economic situation in the months and years after the fire. Perhaps most importantly, quick and effective rehabilitation efforts improve public health and safety.

Rehabilitation treatments include such strategies as:

- Hazard tree cutting to provide safety for workers and the public in burned areas.
- Raking, seeding (with annual and perennial grass seeds) and mulching, to reduce erosion and invasion by exotic species.
- Timber salvage to reduce future fuel loads, recover the economic value of the resource, and to prepare the site for future reforestation efforts.
- Stream enhancements to repair damaged streambanks.
- Construction of structures, such as straw bale check dams and sandbag walls to protect structures and control erosion and runoff.
- Construction of catchment structures to hold sediment and debris.
- Reforestation to hasten forest reestablishment. This includes such steps as pre-planting site preparation, tree and shrub planting, and post-planting maintenance and protection of desirable vegetation.

The BAER Team

When a large fire involves federal lands (USFS, BLM, NPS), a BAER team, or Burned Area Emergency Rehabilitation team, is formed to evaluate fire impacts, and prescribe and implement rehab efforts that will stabilize the burned area to protect human life and other human values. These teams, which include specially trained professionals, such as hydrologists, soil scientists, engineers, biologists, silviculturists, range conservationists, archeologists, often start working even before the fire is contained.

BAER teams have primarily at three objectives:

The NRCS Emergency Watershed Protection Program, a program for private lands, provides up to 75 percent of the funds needed to restore the natural function of a watershed after a fire.[15]

1. Determine if emergency resource or human health and safety conditions exist.

2. Alleviate emergency conditions by helping to stabilize soil; control water, sediment and debris movement; prevent impairment of ecosystems; and mitigate significant threats to health, safety, life, property and downstream values at risk.

3. Monitor the implementation and effectiveness of emergency treatments
In some cases, only a small portion of the burned area is actually treated. Severely burned areas, very steep slopes, places where water runoff will be excessive, fragile slopes above homes, businesses, municipal water supplies, and other valuable facilities are focus areas. The treatments must be installed as soon as possible, generally before the next damaging storm. Time is critical if treatments are to be effective.

BAER teams won't undertake long-term rehabilitation. For example, they will not do replant trees; they will not excavate and interpret cultural sites; they will not replace burned structures, roads & bridges (unless they are critical through ways), or burned fences; they will not replace burned habitat; and they will not treat pre-existing noxious weeds.

EWP for Private Lands

The NRCS EWP program, or Emergency Watershed Protection program, provides similar services on private lands to the BAER team services on public lands. These two programs are often run cooperatively on large fire, with both agencies working together.

Under federal laws and regulations, the purpose of the EWP program is spelled out to do the following:

1. Undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.

2. Provide up to 75 percent of the funds needed to restore the natural function of a watershed in most areas of the country, and up to 90 percent in areas with limited financial resources.

3. Sponsor such work as clearing debris from clogged waterways, restoring vegetation, and stabilizing river banks.

4. Assure that the measures that are taken must be environmentally and economically sound and generally benefit more than one property owner.

Long-term rehabilitation

When it comes to long-term rehabilitation on federal lands, management agencies must follow NEPA (the National Environmental Policy Act) and must take funding out of regular budget funds. What this means in practical terms is that there will probably be limited long-term efforts on public lands, and that those efforts will probably last no more than five years.

For non-federal and private lands, most of the onus for rehabilitation falls on local governments and organizations, or on private landowners. Local governments and organizations may apply for grants through programs such as Section 319 Clean Water funding for reducing nonpoint source pollution (which is usually administered by state water quality agencies). If they qualify, private landowners may receive assistance from some federal programs that are funded under the farm bill, such as WHIP, or the Wildlife Habitat Incentives Program.

Local involvement

Both federal land managers and NRCS personnel need local partners to help with the emergency response and short-term rehabilitation efforts. Local citizens representing conservation districts, environmental groups, historic preservation groups, or local governments, may be asked to assist in the assessment phase under BAER and/or EWP. Local groups may need to be fiscal sponsors to bring money from Washington D.C. into play, assuring that matching funds are secured and accounted for. Finally, local groups may help implement project, secure donations, and coordinate volunteer efforts.

As the Hayman was burning, the USFS formed the Hayman Recovery Assistance Center, or HayRAC, to provide victims, bureaucrats, politicians, the media, and others with a single site to access information. Once the fire was contained, they sought a local group to take over operations of HayRAC. The Coalition for the Upper South Platte (aka CUSP) took on the role of operating HayRAC.

CUSP staff provided administrative support and assistance and a point of contact and coordination of requests for assistance. They coordinated over 40 volunteer events (21000+ hours of volunteer time) in a six-week period, they sought and received funding to provide livestock owners with feed, and facilitated the efforts of a number of working committees that addressed the

long-term, collaborative response to the Hayman Fire.

The Hayman Recovery Assistance Center provided victims, bureaucrats, politicians, and the media with a single point of site to access information during and after the fire.

Preparing ahead of time can make the going a lot easier when trouble strikes.

On the brink of disaster:

What you can do to be ready

For most Americans, disaster is something we see on the evening news. Yet each year, hundreds of thousands of us personally suffer through some type of disaster. Preparing ahead of time can make the going a lot easier when trouble strikes.

One thing's for certain, each year disasters do strike, leaving people and animals injured or dead, and property damage that, on a national level, runs into the billions of dollars. As this was written, over a quarter-million residents in North Carolina are without power for the fourth day as the result of an ice storm, and a similar snow and ice storm in December left over two-million people without electricity in seven states, and travelers stranded through most of the eastern half of the country. Although the word disaster usually implies these kinds of big events, disasters can also be personal events, like a house or barn fire, or local events, like a chemical spill.

As a nation, we are learning about preparedness, but for those of us living in rural communities, it is especially important that we be prepared because community services are often limited, and local responders—like police, fire personnel, and medical facilities—may be many miles away, or quickly overwhelmed by the scope of a major disaster.

Initiation By Fire

Laurie Glauth is a rancher outside of Woodland Park, Colorado. Last summer, Laurie learned many hard lessons about disaster, when the 137,000-acre Hayman fire burned through her ranch.

Laurie grew up in Woodland Park, where her dad was a self-employed land surveyor and engineer. When her dad settled the family in Woodland Park in 1966, it was a sleepy, western-ranching town, with a little bit of summer tourist

traffic.

She first came to the 800-acre ranch with her dad, who purchased calves for Laurie and her brother Mark's 4-H projects from the ranch owners, brother and sister, George and Zelma Warden. Over the ensuing years, Laurie, who owns a health food store and holistic health center in Woodland Park stayed in contact with George and Zelma, helping them out as the need arose.

By the time Zelma died in 2001, Woodland Park had become a bedroom community for the City of Colorado Springs, and land values were skyrocketing for prime development land, like the Warden ranch, which was completely surrounded by the Pike National Forest.

As Laurie says, "Zelma knew what she didn't want to happen to the ranch when she died, and that was development. She didn't want it subdivided. She had no children, and no local family members who would work to keep the ranch a ranch, so she set up a trust for her estate, and made me the trustee."

For most of us the thought of having someone give us a ranch sounds like the dream-of-all-dreams coming true. But for Laurie, it was a big undertaking. During the winter of 2001, Laurie moved everything out of the main house at the ranch to perform some needed renovation work; she stored everything—furniture, clothing, antiques, journals, etc., in a cabin on the far corner of the ranch. Her plan was to spend the next year or so going through the collected goods of the Warden family, and disposing of things according to Zelma's instructions.

When the Hayman started on June 8th, Laurie was a couple of weeks behind on her work: "Last year, I didn't realize it, but the bulls got separated from some of the cows while they were out on the range during the breeding season, so we ended up with a bunch of late calves. Typically, the cattle should have been out [on a forest service allotment] on June 1st, but we were running a week or two behind, so when the fire broke out, we were just branding at the ranch. Thank God. Otherwise they would have been out on the Pike, in an area that burned at high intensity.

"That day that the fire broke out, we could see those huge white clouds rising straight up in the blue sky. We didn't know what was going on, until later that evening when we saw it on the news."

Over the coming days, Laurie and her brother Mark monitored what was going on with the fire, though for the first week or so, it was far north and west of the ranch. But around June 15th, the wind shifted and the fire made a quick dash to the south. Laurie was told she had four hours to evacuate the ranch. But two hours into the evacuation notice, the wind changed again, and she was given a

reprieve. She decided to begin moving the animals anyway.

Laurie enlisted the help of friends and neighbors to evacuate the cattle. Their first stop was at Laurie's mom's place, about seven miles south of the ranch. But that area was soon posted for possible evacuation, so they had to be moved again. Troops of neighbors and area ranchers responded to help, and a rancher about thirty miles away took the herd for over a month.

On June 17th, the fire moved south again, this time burning over the ranch. By some miracle, the main ranch buildings survived, but the cabin that had the accumulated effects of the Warden's burned. And all around the building, the forest was nothing but black sticks.

Preparing for the Worst

One of the best ways to be prepared, is to develop a plan before the disaster strikes. As Lara Shane, spokesperson for the Federal Emergency Management Agency (FEMA—the lead federal agency for emergency response) says, ***"You don't want to be thinking about what you're going to do in an emergency situation for the first time, as that crisis is occurring."***

She adds, "There are three key things we urge people to do:

1. Have a plan. We think it's the most important thing people can do (see the sidebar, Creating a Disaster Plan).

2. Have a disaster supply kit (see the sidebar, Prepare a disaster kit, and

3. During a disaster, listen to your local emergency managers. If you have pets or livestock, make sure your plan addresses their needs.

As Lara says, "Animals are generally not allowed in emergency shelters, so if you have to evacuate, you need to know where you can take your animals."

Laurie adds, *"When you have animals, you have a responsibility to look out for them. If you live in a wildfire area, you shouldn't plan a trip in June and July. Now, I will have a plan for how I can handle the cattle, wherever they happen to be at any given time. My neighbors know my dogs and cat are in the house if I'm gone, and they know where a key is to get them out."*

It's up to you

Ultimately, government emergency personnel will try to help, but it us to you to protect yourself. Plan ahead to assess and address the risks, and take actions to reduce risks. For example, if you live in wildfire zone, provide defensible space by thinning brush and trees around your home and barn. If you live in a flooding area, obtain flood insurance. If you live in a tornado belt, construct a tornado shelter. Your county emergency response personnel or local fire department can help you define your vulnerabilities, but it is really up to you to take the steps that will protect you, your family, your property, and your future.

Nine months after the Hayman, Laurie is thankful for the insights she's gained. "There's an inherent risk wherever you live. But you live there because you enjoy it. There are no guarantees in life. Everyday, we get into a car and drive, and we take risks. So you know what, there is nothing that is super safe in this world or this life, but we can't live our lives out of fear either. I think the best we can do is be prudent, and observant of our environment, and the best we can do is to be stewards and do what is ecologically correct for our environment."

A community should prepare for fire and post-fire recovery long before it happens. Photo by Stephen Vaughen

Disaster plans and kits should include the 5 P's: people, pets, pills, photos, and important papers.

Creating a Disaster Plan

1. Learn about and evaluate what types of disasters could occur in your area. Consider the following types of natural and man-made events when doing your evaluation: Floods, hurricanes, thunderstorms (including tornadoes), extreme winter events, earthquakes, mudslides, wildfires, hazardous materials incidents, or terrorist incidents. Your local fire department, or county emergency services personnel can help you consider the possibilities that you may not think of on your own (for example, the fire department may know about hazardous chemicals that are transported by truck or train through your community).

2. Plan how your household would stay in contact if you were separated. Identify two meeting places: the first should be near your home—in case of fire, perhaps a tree or a telephone pole; the second should be away from your neighborhood in case you cannot return home. Also, identify an out-of-town contact that all family members know, that would include having an out of town contact that can make sure the family is coordinated in communication way. All family members should know who the out of town contact is, so if family members are separated during an emergency, they can all get back in contact with each other through the out-of-town contact.

3. Draw a floor plan of your home. Mark two escape routes from each room. Likewise, if you have a barn that animals are regularly kept in, plan escape routes for it.

4. Post emergency telephone numbers by telephones, including numbers for veterinarians and livestock handlers. Teach children how and when to call 911. If you live off main highways, post written directions to your home along with the emergency numbers, so you can clearly tell emergency dispatchers how to find your home; 'Turn left after the first cattle guard, then drive three miles, then turn right after the green barn', is not something you want to have to think about while the barn is burning.

5. Make sure everyone in your household knows how and when to shut off water, gas, and electricity at the main switches. If you have to evacuate, fill the bathtub, sinks and other containers with water before you turn off the water, so that when you return, there is water immediately available for cleaning and other uses, even if the electricity

is off. Consult with your local utilities if you have questions.

6. Reduce the economic impact of disaster on your property and your household's health and financial well-being. Review property insurance policies before disaster strikes—make sure policies are current and be certain they meet your needs (type of coverage, amount of coverage, and hazard covered—flood, earthquake). Floods aren't covered under normal homeowner's policies unless you have a flood policy. Also, review life and health insurance policies and consider saving money in an "emergency" savings account that could be used in any crisis. It is advisable to keep a small amount of cash or traveler's checks at home in a safe place where you can quickly gain access to it in case of an evacuation.

7. Does someone in your household have special needs (mobility impaired, households where children are home alone during the day, people without vehicles, etc.)? If so, let local fire and emergency response personnel know what the situation is at your home.

8. Consider others. Do you have neighbors that will likely need help? Can your community use assistance in developing the capacity to meet an emergency (see Community Emergency Response Team.

9. Consider your animals. Where will you evacuate them to if you need to leave? If you aren't evacuated, but facing an extended power outage, how much water will they need, and how will you supply it. A gasoline-powered generator can provide electricity during an extended power outage, both for watering your animals and for supplying electricity to your home.

Whether your community contains camels or cats, prepare for their evacuation and care before a fire. Photo by Roger Berry.

Prepare a disaster kit

1. Stocking water reserves should be a top priority. Drinking water in emergency situations should not be rationed. Therefore, it's critical to store adequate amounts of water for your household. Because you will also need water for sanitary purposes and, possibly, for cooking, you should store at least one gallon of water per person per day, in thoroughly washed plastic, fiberglass or enamel-lined metal containers. Sound plastic containers, such as soft drink bottles, are best. You can also purchase food-grade plastic buckets or drums. Seal your water containers tightly, label them and store them in a cool, dark place.

2. Food, unlike water, may be rationed safely, except for children and pregnant women. Use canned foods, dry mixes and other staples on your cupboard shelves. Canned foods do not require cooking, water or special preparation. Be sure to include a manual can opener. Replace items in your food supply every six months. Consider including ready-to-eat meats, fruits, and vegetables; canned or boxed juices, milk, and soup; high-energy foods like peanut butter, jelly, low-sodium crackers, granola bars, and trail mix; vitamins; foods for infants or persons on special diets; cookies, hard candy; instant coffee, cereals, and powdered milk.

3. Assemble a first aid kit for your home and for each vehicle that includes a first aid manual, adhesive bandages in assorted sizes, safety pins, cleansing agents (isopropyl alcohol, hydrogen peroxide), antibiotic ointment, latex gloves (2 pairs), petroleum jelly, 2-inch and 4-inch sterile gauze pads (4-6 each size), triangular bandages (3), 2-inch and 3-inch sterile roller bandages (3 rolls each), cotton balls, scissors, tweezers, needles, moistened towelettes, thermometer, tongue depressor blades (2), and sunscreen. Also include an extra pair of prescription glasses or contact lens. Have nonprescription drugs, like pain relievers, antacids, laxatives and cough/cold medicines in your disaster kit. If you require routine prescription medications, ask your physician or pharmacist about storing them.

4. Tools and other items: Include a portable, battery-powered radio and flashlight, extra batteries, signal flares, matches in a waterproof, shut-off wrench, pliers, shovel, whistle, A-B-C-type fire extinguisher, tube tent, mess kits or paper cups, plates, and plastic utensils, all-purpose knife, household liquid bleach to treat drinking water, sugar, salt, pepper, aluminum foil and plastic wrap, re-sealing plastic bags.

5. Sanitation and hygiene items: Include a washcloth and towel, soap, hand sanitizer, liquid detergent, tooth paste, toothbrushes, shampoo, deodorants, comb and brush, razor, shaving cream, lip balm, insect repellent, contact lens solutions, mirror, feminine supplies, heavy-duty plastic garbage bags and ties, toilet paper, medium-sized plastic bucket with tight lid.

6. Household documents and contact numbers: Have ready to go on short notice and stored in a watertight container—your personal identification, cash or traveler's checks, and a credit card, copies of important documents like birth certificate, marriage certificate, driver's license, social security cards, passport, wills, deeds, inventory of household goods, insurance papers, immunizations records, bank and credit card account numbers, stocks and bonds, emergency contact list and phone numbers, map of the area and phone numbers of place you could go, and an extra set of car keys and house keys.

7. Clothes and bedding: Keep one complete change of clothing and footwear for each household member and three sets of socks and underwear, sturdy work shoes or boots, rain gear, hat and gloves, sunglasses, blankets or a sleeping bag for each household member, pillows.

Community Engagement[1]

Conservation Districts, government agencies, and community organizations all play critical roles in disaster recovery. However, ultimately, community recovery falls to the people living in the community where the disaster hit. Recovery depends on a community joining together and finding solutions to key problems that an individual working alone might miss or take longer to see. **Working in the aftermath of fire, organizations can help citizen-led recovery efforts at many different levels. Here are just a few ways:**

- Fostering partnerships among individuals, community organizations, and agencies
- Education on post-fire hazards and rehabilitation
- Maximizing the resources that flow to the community for recovery
- Providing accurate, timely and usable information to those who need it.

Partnerships among individuals, community organizations, and agencies enhance long-term recovery efforts.
Photo by Ed Spence, NRCS

1 Material excerpted or adapted with permission of Community Partners from the organization's Fire Recovery Initiative Ideas into Action publication From Chaos to Community, Copyright 2005, author Paul Vandeventer. For more information on Community Partners and free access to the complete publication go to www.communitypartners.org.

People find different ways of finding out what's going on in the chaos after a disaster, so pay attention to how information travels in your community.

Get the message out

It can be a challenge to find and help victims. People scatter widely in the wake of a fire. Some go to shelters, some move in with friends or family, or find rental housing. Sometimes people do not want to be found or simply vanish for a while, re-appearing at a later date. Others live out-of-state and have few contacts in the community. Virtually each one, however, wants to quickly find out what's left of their home and property, their neighbors, and the forest they care for.

If possible, get hold of plat maps from a title company, local planning department, or assessor's office to help in finding various properties in the area. Ownership information can also be obtained from the local assessor. If possible, before the fire season, make arrangements to get ownership information in the event of fire. As soon as possible, use a simple computer database program to accumulate and put the information in order.

People find different ways of finding out what's going on in the chaos after a disaster, so pay attention to how information travels in your community. In Colorado, residents of one remote town, impacted by a major wildfire, used the local post office as a meeting place. The post office lobby served as the central place for people to find out about neighbors and available recovery help. Finding people is easier, once you know the locations of community-gathering places. **Some suggestions for getting information from and to fire victims are:**

- Post or distribute flyers in common gathering places;
- Set up and publicize a single voicemail box that people can call to leave their contact information while picking up brief, information updates;
- Ask returning residents if they know where other neighbors have gone;
- Walk from property to property as residents return to assess damage;
- Find where pets and livestock have been boarded and locate their owners;
- Work from mailing and membership lists of homeowner associations and neighborhood watch groups; this information can sometimes be obtained from local planning or police departments;
- Mails notices printed on brightly colored paper to property owners. The post office will hold mail, even if homes are burned, and people will eventually collect what's accumulated and see your notice.

Once you've begun finding people, keep them regularly updated and informed using these and other communication tools:

- Group meetings held regularly in the same location;
- Word-of-mouth;
- Printed flyers;
- Simple photocopied or quick-printed newsletters;
- Mailings;
- Neighborhood telephone trees;
- Public bulletin boards;
- Postings at informal gathering places or in central locations like recovery centers, post offices, stores, key street intersections, community centers;
- Internet email, although, people may have limited email access;
- A website or blog specific to the local recovery effort

Developing a long-term communications plan

During and immediately following a fire, media attention to your community's problems, challenges and courage will probably be intense. Reporters from print and broadcast outlets can be aggressive, even rude sometimes. Some communities may be tempted to shun so much attention. But consider the fact that as media interest in the fire drifts away the world outside your community may assume you've recovered within a few months.

Cultivating and building relationships with the media may help keep resources flowing during the long time it takes a community to recover. Media attention can keep government alert and remind resource providers like grant makers and donors in the area that fire victims need

People Dealing With Disaster

Virginia Kimball, a long-time volunteer for the American Red Cross, has a great deal of direct experience with disaster survivors. She cautions that organizing people following a disaster takes extra patience and sensitivity. "It's important to be prepared for disorganization," Virginia says. "The people you're working to help have just been through one of life's most stressful experiences. Right now it feels to them like nothing but chaos is surrounding them." **Virginia offers the following five points as guides for interacting with disaster survivors:**

- *Many people you encounter, whether they appear so or not, have experienced severe trauma and shock.*
- *People have difficulty taking in new information after a disaster. Those under extreme stress will find it impossible to read for information.*
- *Repetition will be critical when it comes to conveying information or helping people to act. Survivors absorb new information when it becomes relevant to their needs.*
- *Anger is a natural response to trauma. Expect it. Make room for people to express themselves. It's one way of getting ready to move on.*
- *Remember: some people need to speak before they can listen.*

Building relationships with the media may help keep resources flowing during the long time it takes a community to recover.

continuous help. A media consultant, who volunteered to help a fire recovery team, emphasizes the importance of using media strategically to convey and repeat a few basic message points supported by facts such as: "we're working hard to recover and rebuild; it's a long struggle; the community and the watershed needs all the help they can get" and then be specific about those needs. **Elements of a long-term communication plan might include:**

- Developing or duplicating useful materials for distribution to survivors;
- Chasing down destructive rumors and replacing them with truth;
- Developing and maintaining relationships with local print and broadcast media, perhaps even working with local newspaper publishers to secure a dedicated weekly column with updates and meeting information;
- Publicizing the continuing dilemma of disaster-stricken communities and ecosystems;
- Providing elected and other government officials with a front-line perspective on local needs;
- Maximizing the resources that flow to the community from all sources.

Future Disaster Prevention

Immediately following a fire, dangers often lurk that can increase injury, death, property destruction, and environmental damage. For example, years after a wildfire, burned mountain slopes can send muddy debris flows, driven by downpours miles away, hurtling with little or no warning into homes well beyond the burn area. Flash floods can down bridges, destroy homes and public water supplies. **Some post-fire hazards include:**

- Debris—Burned structures may pose health and safety hazards.
- Mudslides and related debris flows;
- Flooding—flood-borne debris can spread hazards over a much wider area than the area directly hit by the fire;
- More fires in areas with unburned fuel;
- Dead trees that may fall;
- Hazardous materials;
- Displaced wildlife.

Vigilance and an organized, clear community voice can help keep federal, state and local agencies and leaders focused on identifying and mitigating dangers from many sources. Disaster prevention communication strategies work might include:

- Researching local conditions likely to endanger communities;
- Keeping in touch with police, fire and emergency management agencies to ensure coordination of protection and prevention efforts;
- Communicating information to individuals and communities about dangers and making sure local officials and agencies do the same by providing, after fires for example, sandbags, jersey barriers and other mitigation measures;
- Alerting local officials to dangers they may be unaware of;
- Recruiting volunteers for such disaster mitigation projects as sandbagging, reseeding, and debris clearance;
- Setting up and educating local residents about alert systems like weather service flash flood watches, ways to protect property from debris flows and flooding, or telephone trees to quickly get out the word about meetings, imminent dangers or other important matters.

Bracing for a Long Recovery

Under the volunteer direction of Dave Stuart, Ira Maser and other local citizens, Rebuilding Mountain Hearts and Lives assumed responsibility for facilitating the long-term community rebuilding process after the 2003 San Bernardino County fires.

Larson and Maser knew that many survivors were not prepared for a long recovery time. *"Like deer caught in the headlights, some people were in shock for months after the fires, while others are still dazed after a year," said Maser. "This is (one reason) the mudslide issues didn't get addressed until people lost their lives."* Along with the general dangers posed by mud and debris flows in the wake of fires in mountainous areas, Maser was referring to a tragic Christmas 2003 debris flow that took members of a church group by surprise at the mouth of a canyon, killing several.

Knowing that the rebuilding process would be long Maser and Stuart put their plans for Rebuilding Mountain Hearts and Lives on paper and applied for grant funds from the California Community Foundation. The foundation is a regional organization that had aggregated about $2 million from a variety of sources to respond to fire recovery needs. The resultant grant, totaling about $160,000, allowed Rebuilding Mountain Hearts and Lives to hire full-time workers who could reach out to survivors, channel financial and material support to them, assist in solving recovery problems and advocate for the interests of individuals and the community.

An organized, clear community voice can help keep federal, state and local agencies and leaders focused on identifying and mitigating post-fire dangers

After a fire, in an effort to learn from a disaster, local officials often will try to upgrade building and planning codes. However, a clear message from disaster recovery research is that some decisions made in the heat of the emergency period immediately following a disaster can compete with opportunities to rebuild a safer community for the future. The pressure exerted by residents and property owners to have their disaster-stricken community rebuilt to its pre-disaster form and condition as quickly as possible is a powerful factor in local, state, and federal emergency management. **As the recovery process begins, issues may include:**

- Inadequate water supply;
- Out-of-date sewage systems such as septic tanks or crumbling pipe work;
- Responsibility for hazard trees;
- Road widths and private driveways inadequate for future emergency vehicle access;
- Questions about underground vs. overhead power lines;
- Compliance with updated zoning and development codes or master plans.

Meeting Management

Be prepared to repeat basic information from meeting to meeting. Repetition might irk a few people, but most folks are preoccupied — even traumatized — in ways that simply leave them unprepared to absorb information until they've heard it several times. **Below are suggestions for hosting effective meetings:**

- Print plenty of extra copies of everything. Don't assume people read something just because they took it with them the first time.
- Provide—and periodically repeat – basic information about resources, services, and available assistance.
- Arrange for agency representatives to make presentations to group about resource availability and the process for securing resources.
- Work with others who are knowledgeable and reliable to check and be sure that the information you are distributing is accurate and up to date.
- Allow plenty of time before and after meetings for people to informally talk and socialize. No one will want or need to be bombarded with information early on, so gauge how much people can absorb. As time goes on, people will grow in their capacity to take in more information.
- Remember that patience with one another strengthens the entire group and helps maintain everyone's stamina in the face of difficult challenges.

- Practice an essential principle of disaster recovery by creating space for time, talk and tears.

Be prepared to repeat basic information. Most victims are preoccupied, even traumatized, in ways that simply leave them unprepared to absorb information until they've heard it several times.

Rumors and Rancor

As a way of regaining certainty, survivors often grasp onto all kinds of information after disasters and forget sometimes to check out what they are hearing for accuracy. In addition, many disaster survivors need to blow off steam, often wanting to direct blame at others they think contributed to or caused their loss. Government officials and agencies — even fire, police and organizations that aid in rehabilitation — often end up as targets. Most folks just need a chance to get things off their chest and will soon regain perspective. Where rancor grows, it may make sense to create a forum in which representatives of the agencies or organizations have a chance to listen respectfully, address issues directly, demonstrate they are human, clarify their agency's capabilities, and commit to working with the community toward resolving problems.

Following fire, victims often grasp onto all kinds of information, some inaccurate. Create a forum in which you can address issues directly, clarify your group's capabilities, and commit to working with the community toward resolving problems.

Summary

While most post-fire recovery efforts focus on the immediate physical and safety needs of those impacted after a disaster, it is important to note that a "community working together" will also be a key component of recovery. During a crisis, conservation districts and other aid organizations can help people support one another. Victims of a disaster, such as a catastrophic fire, often feel isolated and numb, unable to think and plan how to help themselves. By reaching out to victims, using effective communication tools, it is possible to help people caught in the midst of uncertain stressful situations overcome some of these feelings. Sharing relevant and timely information can help alleviate stress in disaster-stricken communities. Immediately after a fire, people make decisions that may have serious, long-term consequences. Helping community members cope and work together in the short-term can have significant impact on their long-term recovery efforts.

The Recovery Process:

Immediately After the Fire

Overview

Fire is a significant life-changing event for many people in a community; they have lost homes or businesses or know others who have. As fire victims clear out debris and wreckage, hopes are kept afloat by promises of help in rebuilding lives. A strong sense of having shared and survived, a catastrophic fire, brings a community together. However, as people concentrate on rebuilding their own lives and solving individual problems, feelings of disappointment and resentment can replace hope if there are delays, failures, or unfulfilled promises of aid.

A good recovery plan can strengthen relationships with local communities and help forge new partnerships. The first step in helping communities recover from a fire-related disaster is to fully understand how the recovery process operates; who makes critical decisions, who does what task, and who is eligible for aid. Yet, the creation and implementation of a recovery plan is a complex undertaking, involving a succession of steps, rules, and government agencies.

Prior to creation of the plan, it is essential to understand what potential hazards may threaten a community, what options are available to reduce risks, and what are the limitations of federal assistance programs: these are the foundations upon which a disaster recovery plan should be built. This section charts the path to a plan that sets in motion community and land recovery.

Burn Area Stabilization and Rehabilitation

The consequences of wildfire on our country's natural resources are as vast as they are varied. Fires burn both public and private lands over a broad gamut of semi-arid rangeland and forested ecosystems, often encompassing entire watersheds critical to public water supplies. Many recent fires have burned with such intensity that the ecosystems of these extensively burned areas

Stabilization activities include short-term actions to stabilize soils and slopes and protect public health and safety

have been drastically changed.

Without emergency stabilization and rehabilitation, many burned areas will recover slowly and be susceptible to further destruction. For example, a lack of vegetation on hillsides increases the likelihood that rain and snow will create flooding and mudslides. In turn, the water quality of streams and rivers are damaged, which can kill native fish. Emergency stabilization helps protect life, property and natural resources from additional damage after a fire. (USDA, 2000)

Stabilization

Stabilization activities include short-term actions to remove hazards and stabilize soils and slopes. Examples of specific actions or "treatments" might include the removal of hazards; seeding by helicopter, plane, or by hand; constructing dams or other structures to hold soil on the slope; placing bundles of straw on the ground, parallel to the slope to slow the movement of soil down hill; contour furrowing or trenching (ditches cut into the mountain or hillsides to catch soil moving down hill); and temporarily fencing cattle and people out of burned areas. Priorities for stabilization activities include protecting human life and property; protecting public health and safety; stabilizing municipal watersheds; stabilizing steep slopes and unstable terrain; and protecting cultural resources. (USDA, 2000)

After the Hi-Meadow Fire, helicopters were used to deliver straw wattles to crews working in steep, remote areas. Photo by Eugene Backhaus

Rehabilitation activities include longer-term actions to repair or improve lands that are unlikely to recover naturally from severe fire damage.

Rehabilitation activities include longer-term actions to repair or improve lands that are unlikely to recover naturally from severe fire damage. Examples of specific actions or "treatments" might include planting or seeding native species; chemical or mechanical treatment to reduce competition; and other efforts to limit the spread of invasive species. Priorities for rehabilitation activities include preventing introduction of non-native invasive species; promoting restoration of ecosystem structure and composition; rehabilitating threatened and endangered species habitat; and improving water quality. (USDA, 2000)

Federal Emergency Stabilization and Rehabilitation Programs

Federal emergency stabilization and rehabilitation programs or "teams" are designed to quickly address post-fire threats. Teams identify critical human and resource values that lie downstream from burned areas and prescribe emergency treatments to protect those values. In many cases, this process begins before the fire is fully contained. It is important to recognize that most federal post-fire activities, especially on private land, center on stabilization and not rehabilitation.

This process by and large includes:

1. identification of severely burned areas;
2. field surveys to verify areas with water-repellent soils;
3. evaluate storm flows to assess flood risks to critical values; and
4. develop treatment prescriptions and request funding.

During and after the fire, federal teams that may be called into action include:

Burn Area Emergency Response (BAER) team

Key Agency: USDA Forest Service
Key Focus: National Forests

The Emergency Stabilization and Rehabilitation (ESR) team

Key Agencies: Bureau of Indian Affairs, Bureau of Land Management, National Park Service, United States Geological Survey, and the United States Fish and Wildlife Service.
Key Focus: public lands

In most cases, the burn intensity of a fire drives emergency stabilization and rehabilitation activities.

The State Emergency Rehabilitation Team (SERT)

Key Agency: USDA Natural Resources Conservation Service
Key Focus: public (state and local government) and private lands

Fire draws media attention while actively burning, but a threat remains after the smoke and news crews clear out. After a fire, damaged vegetation and scorched soils that shed water can lead to severe erosion and flash floods. Photo: Ed Spence, NRCS

Assembling Teams

Based upon principal ownership of burned lands or mutual agreement, one team or agency leads stabilization efforts and coordinates with other teams, local agencies, and community groups. The lead agency initiates action when the fire is almost contained. After quickly evaluating the types of risks present, the leader assembles a core team of professionals such as hydrologists, soil scientists, engineers, biologists, geologists, vegetation specialists, and archeologists, primarily from the local area. Large or complex fires often demand resources not available locally, in such cases, experienced professionals are brought in from regional or national teams.

Burn Intensity

The burn intensity of a fire dictates how quickly emergency stabilization and rehabilitation teams join fire suppression teams in examining fire strength and concentration, and planning for post-fire recovery. Based on fire complexity, emergency teams initiate these tasks weeks before the fire is contained, or, due to safety concerns, only after the fire is out. This decision is made by Incident Command Managers, in consultation with federal, state, and local agencies. Stabilization and rehabilitation activities should not interfere with efforts to suppress the fire.

Fact Sheet:
Burn Intensity Classification

What is Burn Intensity

The following burn intensity classifications can be used to estimate soil heating by vegetative and physical conditions. Fire burn intensity is used in preparing rehabilitation plans and planning other post-fire activities. To determine hydrophobicity scrape ash away and pour water on the soil surface. Hydrophobic soils will cause water to bead at the surface for several minutes. Digging down and examining the extent of root burning can help determine root damage.

Type III or Low Fire Intensity

Indicators: Duff and debris partly burned, soil normal color, hydrophobicity low to absent, standing trees may have some brown needles.

Interpretation: Root crowns and surface roots will sprout quickly (within one year); infiltration and erosion potential not significantly changed.

Category type; primarily rangeland; no sediment delivery; natural recovery.

After a low intensity fire, damaged vegetation may recover quickly. Emergency stabilization is usually not required. Mountain-Mahogany spouts emerge soon after a Type III fire.

Photo provided by Ed Spence

Type II or Medium Fire Intensity

Indicators: Duff consumed, burned needles still evident; ash generally dark colored; hydrophobicity low to medium on surface soil up to 1″ deep; soil brown to reddish brown up to 2″ of soil darkened from burning (below duff or ash layer); roots viable below 1″, shrub stumps and small fuels charred but still present; standing trees blackened but not charcoal.

Interpretations: Root crowns will usually sprout; roots and rhizomes below 1″ will sprout; most perennial grasses will sprout; vegetative recovery is rapid (1-5 years); soil erosion potential will increase due to the lack of ground cover and moderate hydrophobicity.

Category type; steep lightly timbered slopes with grass; some sediment delivery.

Type I or High Fire Intensity

Indicators: Duff consumed, uniformly gray or white ash (in severe cases ash is thin and white or light); no shrub stumps or small fuels remain; hydrophobicity medium to high - up to 2″ deep; 2-4″ of soil is darkened (soil color often reddish orange), roots burned or hard 2 -4′; soil may be physically affected (crusting, crystallization, agglomeration). Standing trees can be charcoal to 0.5 to 1″ deep.

Interpretations: Soil productivity is significantly reduced; some roots and rhizomes will sprout, but only those deep in soil; revegetation is set back (5-10 years); soil erosion potential can be significantly increased

Category type; steep timbered north slopes; dense forest canopy; unprotected drainage; sediment delivery; natural recovery severely limited.

Source: Natural Resources Conservation Service

BAER projects only include emergency stabilization activities that prevent further degradation but do not repair or improve lands.

The BAER Team

Assessing Conditions, Recommending Actions, and Implementing Treatments on Public Lands

Burned Area Emergency Response or BAER is a program of the U.S. Forest Service designed to assess and mitigate post-fire threats. The Forest Supervisor usually selects the BAER team leader. The first tool developed during assessment is a burn-severity map. Typically, the map is developed using LANDSAT or other remote sensed images, and field verified by soil and water specialists. Burn severity maps are compared with other layers, such as soil and topography, to evaluate changes between pre-fire and post-fire hydrology. In addition, different models are used to evaluate hillslope erosion, sediment yield, and changes in the timing, peak, and volume of stream flow.

Areas of potential flooding or excessive sedimentation are identified and treatment options evaluated. Contour logs, straw wattles, and contour raking may be placed on burned slopes to slow runoff and trap sediment. Logs or rocks may be used to armor stream banks and beds. Culverts may be enlarged to handle increased runoff and sediment, and extra cross drains may be installed to prevent gullies and landslides. (Kuyumjian, 2004)

These treatments are considered emergency stabilization that prevent further degradation but do not repair or improve lands. BAER projects are funded for no more than one year following containment of the wildfire, except that emergency stabilization funding can be used for up to an additional two years for treatment effectiveness monitoring and to repair or replace emergency stabilization structures or treatments where failure to do so would imperil watershed functionality or result in serious loss of downstream values. All BAER projects or treatments are funded on a priority basis as established by the National BAER (NBAER) in consultation with the Office of Wildland Fire Coordination. (USDA, 2000)

The USFS requires the BAER team to submit proposed actions (or a recommendation of no action) within seven days of containment. The current listings of BAER and ESR plans can be viewed at the following web site http://www.fws.gov/fire/rehab/ESRPlans.htm. For more information visit a local USFS offices or http://www.fws.gov/fire/rehab/index.htm for the U.S. Fish & Wildlife Service.

What BAER can do:

- Install erosion control devices.
- Plant for erosion control or stability reasons.
- Install temporary barriers to protect recovering areas.
- Install warning signs.
- Replace minor safety-related facilities.
- Install drainage structures on roads and trails.
- Remove safety hazards.
- Prevent permanent loss of critical habitat.
- Plant grass to prevent spread of invasive plants.
- Monitor BAER treatments.

What BAER can't do:

- Replant commercial forests or pastures.
- Excavate and interpret cultural sites.
- Replace burned pasture fences.
- Replace burned buildings, bridges, corrals, etc.
- Repair roads damaged by floods after fire.
- Monitor fire effects.
- Treat pre-existing invasive plants.

Source: Aspen Fire BAER Website. http://www.volunteertaskforce.org/aspenbaer/Aspen_BAER_Monitoring_Home.html.

On the ground before a fire is fully contained, a BAER team evaluates the burned area for threats to life, property, or natural resources due to post-fire flooding and sedimentation.

Assessing Post-Fire Threats

The Role of the BAER Team

In 2000, a prescribed fire near Los Alamos, New Mexico, was blown out of control by erratic, gusty winds. The Cerro Grande Fire exploded into the nearby forest, swept across lands at Los Alamos National Laboratory, and destroyed hundreds of homes in the town of Los Alamos. Even as firefighters struggled to contain the blaze, another problem loomed in the minds of many. Below steep burned slopes, radioactive waste, from the Los Alamos National Laboratory, lie buried. What would happen when the monsoon season began in less than two months and high-intensity thunderstorms saturated the charred landscape?

Answering that kind of question is the work of a multidisciplinary group of natural resource managers and scientists called a BAER team, for Burned Area Emergency Response. Members come from federal and state agencies and often consist of hydrologists, wildlife biologists, archaeologists, soils scientists, geologists, ecologists, engineers, foresters, and botanists. Usually on the ground before a fire is fully contained, a BAER team evaluates the burned area for threats to life, property, or natural resources due to post-fire flooding and sedimentation.

Why is flooding after a fire a major threat? Flames consume litter on the forest floor that normally soaks up water. Additionally, after a fire, soil has the potential to become hydrophobic, or water repellent. Plants have numerous protective chemicals, similar to wax, with which they coat their leaves to prevent water loss. Vaporized by the heat from fires, these substances disperse into the air and then harden over the soil surface when the fire begins to cool. Like the wax on a floor, these substances coat the soil, causing water to bead up and run off quickly. In general, the greater the fire intensity and the longer the fire's residence time, the more hydrophobic the soil becomes.

In the short term, loss of vegetation and hydrophobic soil contribute to flash flooding and erosion—sometimes to the point of landslides. When fallen trees and other fire debris are added to the scenario, floods can become severe. Excessive runoff can carry ash and debris into streams and rivers, contaminating water resources. Mudslides resulting from the Missionary Ridge Fire near Durango, Colorado, washed mud and debris into the Animas River, killing fish in the award-winning trout stream.

In assessing such threats, BAER teams are under intense pressure: they must make an assessment report with seven days of a fire's containment. If threats exist, such as the potential for a landslide, on a steep fire-charred slope, to descend upon nearby homes, the team must develop mitigation measures that

can be carried out before the first damaging storm. In the case of the Cerro Grande Fire, those measures included the construction of a small dam to prevent any potentially radioactive-contaminated sediment from being carried away.

Source: Rebecca Lindsey, NASA
http://earthobservatory.nasa.gov/Study/BAER/

After a fire, BAER teams test for hydrophobic soil and recommend mitigation measures.

Photo courtesy of USDA NRCS

The Cerro Grande Fire destroyed hundreds of homes in the town of Los Alamos. The BAER team developed mitigation measures for fire-charred slopes to protect nearby property.

Photo courtesy of USDA NRCS

Conservation Districts, through the Emergency Watershed Protection Program, alleviate threats to life and private property in the aftermath of a wildfire.

The State Emergency Rehabilitation (SERT) Team

Implementing Treatments on Private Lands Using the Emergency Watershed Protection Program (EWP)

What is EWP?

Each federal team must adhere to different policies and procedures for support, funding, and reporting; however the BAER, SERT, and ESR teams' course of action in assessing post-fire threats and recommending mitigation actions is alike. SERT develops recovery plans, on public (state and local government) and private lands, for approval and funding through the Emergency Watershed Protection Program.

The Emergency Watershed Protection Program alleviates threats to life and property that remain in watersheds in the aftermath of natural disasters such as floods and wildfires. The EWP Program is administered by the USDA NRCS, which provides technical and financial assistance to local sponsoring authorities to preserve life and property threatened by disaster-caused erosion and flooding. Funding is provided through Congressional emergency appropriations. Threats that the EWP Program addresses are termed watershed impairments. These include debris-clogged stream channels undermined and unstable streambanks, jeopardized water control structures and public infrastructure, and damaged upland sites stripped of protective vegetation by fire. If these watershed impairments are not addressed, they would pose a serious threat of injury, loss of life, or devastating property damage should a subsequent event occur. (USDA NRCS, 2004)

Is Financial Assistance Available?

The President, NRCS State Conservationist or, in some cases, the Secretary of the Interior can initiate emergency assistance through EWP. Routinely, the State Conservationist makes the decision to provide EWP assistance to tackle watershed impairments.

Typically, federal funds may cover up to 75 percent of the construction costs required to stabilize and re-establish the watershed. The cost-share rate of up to 75 percent was implemented in 1993, but recent changes would facilitate those that otherwise could not afford to participate in the program by providing up to 90 percent cost-share for limited-resource areas. A listing of limited-resource areas is included in the Appendix. The community and/or sponsors must pay

the remaining cost-share. This amount can be paid in the form of cash, in-kind services such as labor or equipment, or a combination of cash and in-kind services. (USDA NRCS, 2004)

Requirements for EWP Sponsors

Community sponsors work with the NRCS. Project sponsors must be a legal subdivision of a state government, such as a Conservation District, or a state itself, or a local unit of government or qualified tribal organization. Sponsors must have legal authority to obtain the needed property rights, water rights, and permits. Sponsors also must agree to provide the operation and ongoing maintenance, if necessary, of the completed emergency measures. (USDA NRCS, 2004). **Sponsors must take the following steps to begin EWP assistance:**

1. Contact your local NRCS Service Center.
2. Apply for EWP assistance, within 60 days of the event or access to the site, as a local sponsor.
3. Allow NRCS to investigate the site.
4. Allow NRCS to determine if the situation qualifies for EWP assistance.
5. Allow NRCS to request funding for the EWP project.
6. Expect notification of funding eligibility.
7. Allow NRCS to coordinate and plan the EWP project.
8. Help secure land rights and other permits.
9. Provide for maintenance of completed emergency measures.

Who is Eligible for Assistance?

Public or private landowners, land managers, and land users are all eligible to receive EWP assistance from the NRCS. Those who are eligible must have a legal interest or responsibility for the property threatened or impacted by a watershed emergency. Normally, federal lands are not eligible for EWP assistance.

Before work occurs on their property, private landowners often see assessment and stabilization taking place on federal land. This occurs, in part, because SERT teams do not have adequate training or "Red Card" approval needed to enter a burn area before full containment. The "Red Card" system ensures that only fully-trained staff is allowed to enter dangerous areas. NRCS does not currently participate in the " Red Card" program; thus, Incident Commanders routinely do not permit SERT staff to join BAER or ESR teams assessing fire conditions and damage before the fire is out. A sponsor should fully explain safety issues to

Serious and immediate threats to life and property, called exigency or "urgent and compelling" situations. receive immediate attention and priority in EWP funding.

prevent possible feelings of resentment by private landowners.

What are the criteria for assistance?

The EWP Manual documents NRCS policy governing EWP; the National EWP Handbook provides field procedures. NRCS staff administers EWP in the field when sponsors request assistance with disaster damage. NRCS staff completes Disaster Survey Reports (DSRs) describing the watershed impairments at a particular site, their eligibility for repairs, the cost and benefits of appropriate conservation measures, the social impacts, and the environmental and technical soundness of the measures.

Exigency (high priority emergency situations sometimes called "urgent and compelling") sites receive immediate attention and priority in funding; non-exigency sites are addressed as a separate priority. NRCS coordinates its work with Federal agencies, principally the U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service, FEMA, EPA, and U.S. Forest Service (USFS), and with State agencies, including the relevant State Historic Preservation Office, wildlife resource and water quality offices, tribal governments, and local communities. At issue are important regulatory and environmental requirements, such as protecting Federally listed endangered or threatened species and preserving unique cultural and historic resources, including those listed on the National Register of Historic Places (USDA NRCS, 2004).

Key priorities include:

- Serious and immediate threat to life or exigency situations.
- Sites where there are serious but not immediate threat to human life.
- Sites where buildings, utilities, or other important infrastructure components are threatened.
- Other priorities established by the Chief of NRCS.

How is funding distributed?

Funds are allocated based upon Damage Survey Reports (DSR). DSRs document the economic, environmental, and social effects as well as the technical information and estimated costs for installation of the measure. A SERT team of discipline experts, an engineer, biologist, contracting specialist, economist and social sciences expert, complete the DSRs. This team collects the site-specific information needed to ascertain whether each individual site is defensible. Since each site is evaluated on its own merits, only those measures that are defensible,

EWP funds cannot be used to solve or improve problems that existed before the disaster. EWP funds, in general, cannot be used on federal lands.

i.e. where the positive effects outweigh the adverse effects are eligible for installation. However, Congress must approve emergency appropriations, for EWP, before any funding is allocated or distributed. (USDA NRCS, 2004)

What Can't EWP Do?

EWP funds cannot be used to solve or improve problems that existed before the disaster. EWP cannot fund operation and maintenance work, or repair private or public transportation facilities or utilities. EWP funds, in general, cannot be used on federal lands.

In most cases, EWP assistance cannot be used to:

- Repair, rebuild, or maintain public transportation facilities, or correct damage to transportation facilities eligible for assistance under programs administered by Federal Highway Administration.
- Perform work on land or improvements owned by and/or managed by other federal departments and agencies.
- Landscape for aesthetic purposes
- Remove sediment or debris from reservoirs or debris basins, regardless of ownership
- Rebuild or protect when there is nothing left to protect

Key EWP Timelines

- Damage survey reports are due 5 days after disaster.
- Construction completed within 10 days of funding approval for exigency situations and within 220 days of funding approval for non-exigency situations.
- Sponsor request for assistance 60 days of the event/or access to the site.

For more information visit http://www.nrcs.usda.gov/programs/ewp

EWP Questions and Answers

What is EWP?

The Emergency Watershed Protection Program (EWP) helps communities respond to emergencies created by natural disasters. It is designed to relieve imminent hazards to life and property caused by floods, fires, and other natural occurrences. The Natural Resources Conservation Service is responsible for administering the program.

Who is eligible?

Public and private landowners are eligible for assistance but must be represented by a project sponsor. The project sponsor must be a public agency of state, local, or tribal government, or a conservation district.

What does the sponsor have to do?

Sponsors are responsible for providing land rights to do repair work and securing the necessary permits. Sponsors are also responsible for furnishing the local cost share and for accomplishing the installation of work. The work can be done either through federal or local contracts.

Is financial assistance available?

NRCS may bear up to 75 percent of the construction cost of emergency measures or up to 90 percent in limited resource areas. The remaining cost-share must come from local sources and can be in the form of cash or in-kind services.

What are the criteria for assistance?

All EWP work must reduce threats to life and property. Furthermore, it must be economically and environmentally defensible and sound from an engineering standpoint. EWP work must yield benefits to more than one person. All work must represent the least expensive alternative.

What can't EWP do?

EWP funds cannot be used to solve or improve problems that existed before the disaster. EWP cannot fund operation and maintenance work, or repair private or public transportation facilities or utilities. In addition, EWP funds cannot be used to perform work on measures installed by another federal agency.

How do I get assistance?

If you feel your area has suffered severe damage and may qualify under the EWP program, you are encouraged to contact your local sponsor to request assistance. Information is available from local NRCS offices to explain the application and eligibility requirements for the EWP program.

All applications must be submitted within 10 days of the disaster for exigency situations and within 60 days of the disaster for non-exigency situations.
Source: NRCS at http://www.nrcs.usda.gov/programs/ewp/

private lands to listen to citizens.

Lessons Learned

In helping a community recover from a fire-related disaster, a Conservation District or other organization must understand the recovery process; who makes critical decisions, how projects are funded, and who is eligible for aid. Those who have taken part in the creation and implementation of a recovery plan know that it involves success and failure, complex rules, and numerous government agencies. **Some lessons learned, from participants in post-fire recovery are listed below:**

- After catastrophic fire, political pressure is high to get something done very quickly. Consequently, projects can be generated with very little field information. This can result in a waste of resources and extra work later in the process. The need to "do something" versus installation of cost-efficient and effective treatments must be balanced.

- Identify a limited number of key stabilization/rehabilitation treatments in development of a recovery plan. Experience shows that specific treatments, such as revegetation and mulching, are commonly proposed projects. This can speed recovery plan development and approval, funding, contracting, and installation, which are critical when time, staff, and financial resources are limited.

- Be careful with infrastructure replacement and installation of structures as federal audits concentrate on these types of activities.

- A problem for many organizations is staffing. How do you staff for immediate needs knowing that the funding will go away in 1- 3 years? It is important to have staff with contracting experience and who pay attention to detail.

- Check with the NRCS contracting officer for ways to speed contracting. Tools have been developed to expedite contracting, including contracts developed for use across agency lines.

- Document all aspects of your work in preparation for questions from federal auditing or regulatory agencies, and, in some cases, news media, environmental groups, and community organizations.

- Often, an interagency Multi-Agency Coordinating group can speed and

simplify rehabilitation efforts. The group can involve all federal and state agencies, including the NRCS. A sample document for a coordinating group is included in the Appendix.

• Don't forget about indirect costs. It is essential that you make good estimates and plug them in at the front end for all projects. Many times, you won't be told you can charge indirect costs and such costs cannot be added to a project once it is approved.

• Try to use local labor and supplies for stabilization and rehabilitation work. Community healing can be aided by providing economic opportunities. (USDA, 2002)

Fire does not follow ownership and political boundaries. The 2002 Hayman Fire affected countless individuals (133 homes were lost) and organizations; coordination was crucial to successful recovery. The Hayman Recovery Center coordinated efforts between governmental and nonprofit organizations.

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"Volunteers are not paid-- not because they are worthless, but because they are priceless."

—Anonymous

Towards Recovery:

Organizing and Utilizing Volunteers

Why Use Volunteers

After a disaster, volunteers typically get involved and make a difference. Even people who experience no loss feel compelled to pitch in and help. Volunteers increase public involvement in watershed recovery and rebuild a sense of community.

Major wildfires often attract the interest of charitable and aid organizations with the means to grant funds to cover the financial costs of stabilization and rehabilitation or other aspects of recovery. Local groups, such as Conservation Districts, who are close to the disaster and aware of local needs, have great credibility with funding organizations and with donors. Local groups, with established community partnerships, will often be asked by funding organizations to sponsor recovery efforts.

Under some recovery plans, like the Emergency Watershed Protection program, federal funds may cover up to 75 percent of the costs required to stabilize and re-establish a burned watershed. However, sponsors are responsible for the remaining cost-share. This amount can be paid with in-kind labor from volunteers.

Volunteer Program Start-Up

In many disasters, the devastation and loss is so great that the outpouring of community support is immediate and significant.

Your organization should be prepared for the influx of volunteers and develop a plan of action that includes:

- Development of volunteer and partner databases

A volunteer database that is searchable and can be queried is an invaluable tool for matching volunteers with projects and victims in need.

- Plan for handling volunteer requests
- Creation of a media releases
- List of potential projects and priorities
- Plan for volunteer training and safety
- A plan for addressing liability and injury issues; including creation of volunteer waiver and release of liability forms

Volunteer Database

After the 2002 Hayman Fire, the Hayman Recovery Assistance Center (Hayrac) created a volunteer database in Microsoft Access. The database includes contact information and general notes on each individual or group (see Appendix for the database template). A datasheet was also developed for volunteer contacts, from phone calls for example, until the information can be entered into the database.

If possible, you should directly enter information into a database; it saves time and paper. Some organizations register volunteers on-line. An example of an on-line donation and volunteer registration, used for Hayman Fire recovery, can be found at http://www.uppersouthplatte.net/. This is a great way to gather volunteers but could be difficult to start up immediately after a fire. Before a fire strikes, you might want to establish partnerships with organizations that have on line volunteer and donation websites.

A database that is searchable and can be queried is an invaluable tool for matching volunteers with projects and victims in need.

The database should include the following fields:

- First Name, Last Name
- Address, City, County, State, Zip Code
- Work Phone, Work Extension, Home Phone, Mobile Phone, Fax Number
- Email Address

A volunteer program develops out of strong commitment to community. But program success will be due to partnerships with a variety of agencies and organizations.

- Date of Birth (used to determine adult or minor)
- Contact Type (Volunteer, Donor, Both)
- Contact ID (Generated automatically by the database)
- Skills
- Interests
- Form Completed By
- Date
- Follow-up (USDA USFS, 2002)

Other useful information includes:

- Fax number
- Two contact names and information for groups
- Type of work volunteer is willing to perform
- Amount of time volunteer is willing to work (days and dates)
- Space to log contact calls to volunteer
- Space to log work completed by volunteer and final thank you letter or gift
- Receipt of permission and liability waiver forms

If using a computer database is not feasible, you should create color-coded, single page forms that can be easily filled in by the staff taking volunteer calls. This allows you to sort volunteers into categories for instance individuals, groups, or donations when you know if they are unaffiliated or part of a group. After a large fire, volunteers and projects come from a widely spread area and filing volunteer offers by geographic area is preferred. Volunteers are often unenthusiastic about traveling long distances.

It is important for staff working telephones to have a basic understanding of the type of assistance needed for each project and general principals of rehabilitation and stabilization practices.

The moment it's clear you're a reliable local group trusted in the community, you'll become a central point for one and all, from individuals to large corporations, who want to volunteer and help out.

Volunteer Partnerships

Any volunteer program develops out of strong commitment to community. But program success will be due to partnerships with a variety of agencies and organizations.

Key partnerships that can aid in development of volunteer programs include:

- Conservation Districts;
- USDA Forest Service or other federal land management agencies;
- USDA Natural Resources Conservation Service; including Earth Team;
- State Forest Service;
- Non-profit volunteer organizations, like the Red Cross;
- Service organizations;
- National Voluntary Organizations Active in Disaster (NVOD);
- Local governments.

A good example of a partner is Volunteers for Outdoor Colorado (VOC). After Hayman, VOC stepped in with 15,000 registered volunteers, trained crew leaders, and experienced project coordinators and assisted fire victims and recovery organizations. NVOD is a wide-ranging network of aid organizations that focus on post-disaster needs and long-term recovery. The network includes national, regional and local organizations (http://www.nvoad.org/). Your community may have similar non-profit volunteer organizations.

Generally, volunteer hours for children under 14 cannot be used for in-kind labor; but hours donated by adult leaders and parents can be used. Girl Scouts work on public or private land provided the project is for the "common good" of a community. Boy Scouts work only on public land.

Partnerships with clubs, civic groups and churches are ideal; the groups have established communication links and structure. People with a common mission are comfortable working together and with the community. These partnerships are invaluable resources to a volunteer coordinator; clubs, civic groups, and

churches know how to get things done and have their own resources.

Large corporations encourage employees to participate in a yearly community public service project and will often select a fire recovery. According to one coordinator, "Churches are the easiest to work with, they are experienced in bringing their own supplies and usually have their own bus. Volunteer transportation is often a huge problem."

The USFS sometimes supplies funding and staff for assistance centers. A fire recovery assistance serves as a community resource for information about the efforts, knowledge, and programs for post-fire rehabilitation.

Volunteer Coordinators

The moment it's clear you're a reliable local group trusted in the community, you'll become a central point for one and all, from individuals to large corporations, who want to volunteer and help out. If your organization cannot handle a large number of volunteers, it's best to pass on to local agencies capable of handling the volume. Though, organization, and a good volunteer coordinator, can make this task possible.

A volunteer coordinator can lend a hand in:

- Coordination with partner agencies and nonprofit organizations;
- Coordination with Incident Command Leaders or BAER teams early in process;
- Project identification and prioritization;
- Tracking of volunteers, services and donations;
- Reviewing project proposals;
- Ensuring the safety of volunteers and adequate training;
- Coordination of projects and partners that cross ownership and political boundaries;
- Obtaining funding and resources for projects;
- Matching the right volunteer with the right project.

Earth Team Volunteer Coordinators

The Earth Team program has national, regional and state volunteer

After a catastrophic wildfire, the outpouring of community support can be instantaneous and great. You should be prepared to put volunteers to work soon after the smoke clears and for years to come.

coordinators.

State Volunteer Coordinators typically:

- Coordinate Earth Team activities and assist other volunteer coordinators across a state;
- Work with the State Conservationist on Earth Team activities;
- Recommend and implement volunteer and volunteer supervisor training; and
- Coordinate volunteer recruitment, recognition and promote national recognition of volunteers. (NRCS, 2006)

Recovery Assistance Center Coordinators

A fire recovery assistance center is designed to serve as a community resource for information about the efforts, knowledge, and programs for post-fire rehabilitation. Centers are a central location where people can learn about federal, state, and local assistance programs.

Typically, the United States Forest Service supplies funding and staff, to a non-profit organization, for assistance centers. The grant allows a non-profit organization to serve as clearinghouse for fire rehabilitation services. Assistance centers help fill a gap that the USFS cannot, by providing volunteers, securing grants for and completing projects. Government agencies are often constrained by rules in the National Environmental Policy Act (NEPA), the Archeological Resource Protection Act (ARPA), or the Endangered Species Act (ESA). Often, a non-profit organization, is less restricted and, can quickly respond to unmet needs.

Centers have volunteer coordinators that can organize projects across ownership and political boundaries. Fire recovery assistance centers have been successful in Colorado, New Mexico, South Dakota, and Montana.

Project Identification and Prioritization

Again, after a catastrophic wildfire, the loss of homes and natural resources is so great that the outpouring of community support is instantaneous and great. If possible, your organization should be prepared to put volunteers to work soon after the smoke clears and for years to come.

Conservation District Leads Volunteer Efforts

In 2003, the Fremont Conservation District (Fremont County, Colorado) received the NRCS National Earth Team Award for Leadership. Conservation District Earth Team volunteers logged 975 hours in one year. Volunteers worked on fire rehabilitation efforts at the Iron Mountain Fire Site near Canon City, where more than 4,000 acres of land burned.

The district worked endlessly to stabilize and rehabilitate scorched hillsides, where 80 homes were consumed. As soon as the fire was out, the district worked to control erosion and protect nearby property.

The district organized volunteer days where more than 100 volunteers helped install conservation practices. To prepare for the many volunteers, they gathered tools, safety equipment, and trained volunteer crew leaders. Supervised by crew leaders, volunteers seeded, mulched, and raked burned areas.

Volunteers worked long hours installing sandbags, straw wattles, and rock check dams. Although fire mitigation took much of their time, the district held a weed identification tour, and developed a revegetation handout for fire victims.

Earth Team is the volunteer arm of the Natural Resources Conservation Service. Since the program began in 1982, more than 38,000 volunteers have donated more than 1,100,000 hours protecting the nation's natural resources.

Source: National Association of Conservation Districts

Working together, conservation districts and Earth Team volunteers make a visible contribution to post-fire recovery.

Photo courtesy of Ed Spence, NRCS

Stabilization and rehabilitation projects will be identified and prioritized based upon Projects are best prioritized using the BAER report, EWP Final Report, damage assessment findings, or unmet community needs. You must also take into account safety issues as well as technical and professional licensing requirements. Generally, volunteers should not be placed in hazardous situations or where specialized skills are required.

The types of projects volunteers assist with often include:

- Short term Burned Area Emergency Rehabilitation (BAER) or stabilization;
- Long term Burned Area Emergency Rehabilitation (BAER);
- Hazardous Fuel Reduction; and
- Community assistance on state and private land.

Types of Volunteer Work

An experienced Earth Team Volunteer Coordinator says, "I don't refuse an offer of help. My worst experience is someone not showing up for a workday. Most volunteers know their own limits and, if needed, will slow down as the day wears on." **Typically volunteers with the following skills will be needed:**

- Patient, kind, knowledgeable people to answer telephones;
- Well-organized and detail-oriented people to handle volunteer applications, enter information into computer databases, and make follow-up calls;
- People willing to get dirty, raking and seeding;
- Red Cross Youth Corps and Emergency Response Vehicle for work site food and water support;
- Seasoned and strong outdoor types who can lift and place heavy wattles, logs or bales of straw;
- People with ATV's or 4x4's for hauling materials to work areas.

Facts about the Earth Team Volunteer Program

Since the organization of local conservation districts in the 1930s, people have volunteered their time and talent in getting conservation on the land. Through the decades, volunteering has remained an important part of America's conservation movement.

What is the Earth Team?

The Earth Team, the volunteer arm of the USDA Natural Resources Conservation Service (NRCS), recruits volunteers in more than 3,000 locations across the country. Anyone 14 years of age or older can join the Earth Team. Volunteers can work outdoors or in a local office. Individuals or groups can donate time as a volunteer.

Volunteers are a hassle. Why bother?

Volunteerism is the foundation of conservation districts and the NRCS. The Earth Team requires very little paperwork. Once a volunteer signs-up and receives an ID card, a simple timesheet is all that is needed to track time and attendance.

What do volunteers do, anyway?

NRCS and conservation districts have benefited from the service of more than 300,000 volunteers who have contributed more than 10 million hours of service, valued at more than $167.2 million.

What if I just need help on one project?

Volunteer work assignments cover a wide variety of jobs that vary from a few hours to long-term commitments. Just balance project needs with volunteer interests and availability.

What can the Earth Team pay for?

Although volunteers cannot be paid, NRCS provides training, worker's compensation and personal liability coverage, and can pay for commuting expenses, travel and per diem, transportation, and equipment costs.

When should volunteers be used?

The use of volunteers should be based on need. A needs assessment should precede any volunteer recruiting effort.

A needs assessment asks:

- What jobs can be done by volunteers?
- What needs to get done but we don't have the resources for?
- What tasks can be done better by a volunteer?

Source: USDA NRCS http://www.nrcs.usda.gov/feature/volunteers

Volunteer Agreements and Liabilities

Though rare, volunteers injure themselves, someone else or damage private property. Usually, private insurance carried by the volunteer can take care of the damage, but sometimes lawsuits result. Federal and state laws protect volunteers and non-profit organizations from personal liability. However, laws are complex and contain numerous conditions and limitations. Discussion of liability issues is included in the liability section of the handbook.

Some groups, like Girls Scouts and churches, have a blanket liability release policy. In such cases, by and large, leaders have liability training and will complete all paperwork in a timely manner.

Volunteer agreements should be completed prior to any work being performed. Examples of individual and group agreements and other sample agreements are included in the Appendix. The purpose of the volunteer agreement is to ensure that the volunteer is covered for tort claims and compensation for work injuries.

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A rapid post-fire response is essential to protecting homes, businesses and watersheds, but inevitably exposes some organizations to unplanned legal liability.

Liability Issues

Volunteer Protection

Conservation Districts and non-governmental organizations play an active and vital role in providing assistance to fire victims in part by linking landowners to post-fire assistance. They also administer assistance programs such as the NRCS Emergency Watershed Protection Program (EWP). By serving as an EWP sponsor, organizations essentially become general contractors with the authority to quickly organize professional post-fire rehabilitation crews and volunteer groups. After the Hayman Fire of 2002, the Coalition for the Upper South Platte (a group comprised of local conservation districts and non-governmental agencies) coordinated numerous funding sources and more than 40,000 hours of volunteer time for fire rehabilitation.

The rapid response these organizations facilitate is essential to protecting homes, businesses and watersheds. But the scope and size of these projects inevitably expose some organizations to unplanned legal liability. It is nearly impossible for any organization working in a fire zone to keep one eye on limiting liability while moving rapidly to mitigate post-fire hazards, assess fire damages, determine the best plan of action to protect the public's safety, and minimize further property damage. This chapter provides a brief outline of the kinds of liabilities organizations and individuals can incur and offers some suggestions for risk management strategies organizations might want to consider to protect themselves, their employees and volunteers.

The Federal Volunteer Protection Act

Sometimes volunteers have accidents, injuring themselves, someone else or damaging private property in an auto accident. Usually, private insurance carried by the volunteer can take care of the damage, but sometimes lawsuits result. The Volunteer Protection Act of 1997 grants immunity from personal liability to those who volunteer for nonprofit organizations. It is intended to

The Volunteer Protection Act of 1997 grants immunity from personal liability to those who volunteer for nonprofit organizations. However, the law is complex. It contains numerous conditions, qualifications and limitations

encourage volunteerism and the recruiting of volunteers by reducing liability risks to individuals who give their time in the service of the community. The law preempts inconsistent state laws, standardizing protection that varied greatly from state to state.

However, the law is complex. It contains numerous conditions, qualifications and limitations, which may raise questions concerning the practical application of the law.

The Act provides civil (but not criminal) liability protection for non-profit or government volunteers if:

- The volunteer is acting within the scope of his/her responsibility;

- The volunteer is properly licensed, certified or authorized to engage in the activity or practice (if required by the state in which the damage occurred) and those activities were within the scope of the volunteer's responsibility;

- The harm was not caused by willful or criminal misconduct, gross negligence, reckless misconduct or a "conscious, flagrant indifference" to the rights or safety of the individual(s) harmed by the volunteer; and

- The harm was not caused by the operation of a motor vehicle, aircraft, or other vehicle for which an operator's license or insurance is required by the state.

Using an ATV is great way to mulch steep areas; however, federal and many state volunteer protection laws don't cover operation of a motor vehicle.

Volunteers and organizations incur liability during the operation of a motor vehicle, aircraft, or other vehicle; these actions are not granted immunity in federal volunteer protection laws.

Relationship of Federal Law to State Laws

The federal Volunteer Protection Act overrides existing state laws except those that provide greater volunteer protection than federal law. However, the statute does allow states to enact their own legislation to make the federal law inapplicable in a particular state.

No state has adopted the Federal Act in its entirety, and few states have identical provisions protecting volunteers.

Each state's provisions dealing with volunteer protection can be compared to Federal law and generally categorized as follows: states that give the broadest protection to a wide range volunteers, states that limit protection to a more narrow group of volunteers, and those that focus protection on officers, directors or trustees of nonprofit organizations or other entities. A more detailed discussion of volunteer protection in individual states is covered in Appendix 7.

Exceptions to the Volunteer Protection Act

Federal law allows states that have existing restrictions on volunteer immunity to retain some of those limitations without having to enact new legislation. These restrictions, which states may also adopt at a later date, include:

- Requiring non-profits or governmental entities to adhere to risk management procedures, including mandatory training of volunteers;
- Laws that make the organization's liability for the acts of its volunteers consistent with its liability for the acts of its employees;
- Volunteer immunity is waived if the lawsuit is brought by a state or local officer to enforce a state or local law; or
- Requiring, as a condition of limited liability, organizations or governments to provide a financial source of recovery for individuals who suffer harm as a result of actions taken by a volunteer. Acceptable sources of recovery could include an insurance policy or risk pooling mechanism, with specified limits; or equivalent assets that demonstrate that the organization could pay for losses up to a specified amount.

In any case, liability limitations would not apply to violations of federal statutes regarding civil rights laws, crimes of violence, terrorism or hate crimes, or to misconduct committed while under the influence of alcohol or drugs.

Liability for Professionals

While most volunteers are protected from liability, in most states, statutes do not protect licensed professionals who volunteer their professional services in a time of crisis.

After a wildfire, local governments and other organizations may not have the resources to respond adequately to some of the challenges that confront them. For example, after the Hayman Fire, engineers and hydrologists were needed to design and build large sediment control structures to protect the water supply for the Denver Metropolitan area. Professionals, such as engineers, architects, and hydrologists, are willing to volunteer their services to ensure the protection of a community's health, safety, and welfare. During such situations, a licensed professional may be exposed to questions of liability even though he or she is acting in good faith to help the community. While most volunteers are protected from liability, in most states, statutes do not protect licensed professionals who volunteer their professional services in a time of crisis. However, some states have recognized the importance of giving licensed professionals immunity during an emergency. It is important that organizations managing professional volunteers inform them of possible exposure to personal liability.

The following states provide some immunity to volunteer professionals: California • Colorado • Connecticut • Delaware • Florida • Georgia • Illinois • Kansas • Kentucky • Louisiana • Maryland • Michigan • Missouri • North Carolina • North Dakota • Oregon • Pennsylvania • Tennessee • Utah • Virginia • Washington

Organizational Liability

Federal or state law does not eliminate some liability risks for associations and their volunteers. For instance, it is important for organizations to consider that while federal law protects volunteers from personal liability, it does not limit an organization's exposure to liability for the acts or omissions of a volunteer operating within the scope of his/her responsibilities for the organization. Board and volunteer liability usually comes from hiring and firing decisions, claims of gross negligence and willful or wanton misconduct, or from failure to oversee the functions of the organization. Staff risks are often professional "errors or

omissions", but can involve mismanagement of funds, job-related injuries, and auto accidents.

Non-profits also face exposures that arise from special events, such as performances, training sessions or exhibits with charitable or fund-raising purposes.

Effective risk management for associations involves several layers of protection, just as with automobile safety or fire safety. Training and education of employees and volunteers, indemnification of individuals by the association, and association liability insurance can be good precautions to reduce risk.

Insurance Coverage

There are few issues to consider before you consider buying insurance. Some government agencies require contractors to carry liability coverage, or your organization may have promised to indemnify board members. In these and other cases, you need to know not only the overall purpose for having each type of insurance but also the liabilities or exposure that each policy covers.

General Liability

The key element of an organization's coverage is the general liability policy. This coverage includes many types of protection such as fire, theft, flood, premises liability, personal injury, and sometimes, automobile coverage.

Directors' and Officers' Coverage

Non-profits and other organizations may want to consider purchasing insurance to protect board and staff, indirectly protecting the organization that may have to indemnify them. Directors' and officers' insurance covers the legal liabilities of the board discussed earlier. When staff members make errors, boards are sometimes accused of negligent hiring or supervision, wrongful discharge, discriminatory practices, or other discretionary acts.

Even though laws may exempt the typical board from liability for ordinary negligence, this does not shield the organization from being sued and from incurring defense costs. And, again, volunteer immunity does not apply to acts of gross negligence. Most policies do not exclude gross negligence, but you may wish to make sure. Generally speaking, if a coverage is not specifically excluded, it's usually covered in an insurance policy.

Even though laws may exempt the typical board from liability for ordinary negligence, this does not shield the organization from being sued and from incurring defense costs.

Staff and Volunteer Coverage

Accident Insurance

Accident insurance provides excess accident medical insurance directly to a volunteer when he or she is injured traveling directly to or from, or participating in, volunteers activities. "Excess" simply means that if the volunteer has other insurance that insurance would be primary, and the coverage provided by an accident policy would be in excess of primary and supplemental policies. If the volunteer has no other insurance coverage, accident coverage acts as primary coverage.

Volunteer Liability and Excess Auto Liability

A volunteer's actions may cause physical injury to another, or damage to another's property. As discussed earlier, if the injured party feels that the damage resulted from negligence, the volunteer may be sued. Organizations that want to proactively protect their volunteers might want to invest in a personal liability and excess automobile liability insurance.

There are also specific types of insurance coverage for staff and volunteers, as well as, professional liability, workers' compensation, and bonds of specific acts.

Resources

Sample Forms

Examples of volunteer waiver and indemnification forms are provided in the Appendix.

Additional Resources

Another valuable information resource is the Nonprofit Risk Management Center, a non-profit research and education center regarding insurance and risk management issues for community-serving organizations. It offers a wide array of useful publications and can be contacted at 1001 Connecticut Ave., N.W., Suite 900, Washington, DC 20036, (202) 785-3891 or reached on the Web at www.nonprofitrisk.org

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Restore Landscapes

Rebuild Communities

Just because the US Forest Service or Bureau of Land Management BAER Implementation teams have finished, or the 220 days are over for the NRCS EWP program--this does not mean that recovery is complete. Often, local communities are left to fill the gap…moving towards long-term rehabilitation.

Federal land management agencies set aside monies for short-term rehabilitation and stabilizing the soil after a fire. Once the crews are gone, additional projects will most likely come from local governments, fire victims, conservation districts, and nonprofit organizations.

It is not necessary to reinvent the wheel when it comes to figuring out the path toward recovery and rebuilding. Conservation districts and other groups in fire-stricken communities have come together in the past around their common interest in restoring watersheds, safety, infrastructure, and a sense of community stability. Not one of them would say that the process of recovery and rebuilding was easy or brief.

This part of the handbook describes the gaps, hazards, and challenges of long-term recovery with examples, lessons and resources. Information on flooding, mud flows, noxious weeds, timber salvage, rehabilitation methods, insects and other post-fire issues are included in this section.

Who faces the challenge of long-term recovery?

- People whose homes were either damaged or totally destroyed;
- People with undamaged homes in burned areas;
- People living near burned mountains or hillsides;
- Business owners who lost property, sustained damage or lost customers;
- Local governments, conservation districts, and other aid organizations with limited resources to devote to fire recovery.

How long does the long-term recovery and rebuilding process last?

• With or without intervention, after a fire, it takes many years for control of non-native invasive species; restoration of ecosystem structure and composition; restoration of threatened and endangered species habitat, and improved water quality;

• The direct and indirect effects of the wildfires often exact a heavy economic toll on local communities. It can take many years for economic recovery;

• For rebuilding, one to three years for most people ;

• For flooding and mudslide flow risks to return to pre-fire levels, the shared view is that it can take eight to ten years for vegetation to grow on scorched hillsides and hold soil in place.

Post-Fire Hazards

Once the smoky haze clears from a wildfire, the danger is not over. Flash floods, landslides, and mudflows can be one of the most perilous consequences of fire. Just a small amount of rainfall on a burned area can lead to these hazards. Rushing water and debris, from burned areas, can wipe out roads, bridges, and homes, and can cause injury or death. In 1978, a post-fire flood killed 13 people in Los Angeles County.

A forest of burned trees is a dangerous place. Dead or dying trees-their trunks, roots and branches weakened by fire-can easily topple. A sad example is the tree that fell on a firefighter in a burned area of the Missionary Ridge Fire, killing him instantly. This section contains examples of post-fire hazards and ways to reduce risks.

Many trees damaged by fire easily topple and are a hazard to recovery workers and residents.

Flooding

Severe fire causes physical and chemical changes to mountain watersheds, resulting in hydrophobic soil, decreased transpiration, decreased infiltration, altered water chemistry, and increased runoff. After a fire, peak flow flood potential is 10 to 10,000 times greater than pre-fire levels.

Post fire erosion rates may be up to more 100 times greater than on a well-vegetated watershed (Radtke, 1983). Sediment from increased erosion, clogs, dams and changes water courses, adding to flooding hazards.

Most post-fire treatments are not designed to handle runoff from large storms and cannot stand up to the amount of runoff created by bare, cooked hillsides. The science of foreseeing post-fire flooding is improving and evolving. Although, as the example below shows, there is no way to pin down exactly when or where walls of water, sediment, and rock will strike.

When the rains began to fall, on July 12, 1996, few realized what would result from the cold embers of a wildfire and ended with death and comprising the water supply of Denver.

The disaster began several months before the first ill-fated raindrop fell, when a campfire, left unattended, set fire to the surrounding woodlands. Driven by hot, dry, and windy weather, the fire erupted, destroying 12,000 acres in one day. The swift, intense fire left large areas of baked soil that would not absorb water.

So when the pounding thunderstorm inundated the charred slopes, "it was like pouring water on concrete," said a local volunteer fireman. In less than an hour, more than 2.5 inches of rain fell on an area that, on average, gets less than 15 inches a year.

With little warning, overflow from the rapid, intense storm cascaded towards the town of Buffalo Creek. The town was nearly demolished and three lives were lost. Homes saved from fire were quickly washed away. Roads, bridges, water lines, and other utilities were destroyed. Few, if any, had seen anything like it before.

Sediment and debris piled up damming the creek. When it gave way, an eight foot wall of water and sediment surged into the primary source of Denver's drinking water, Strontia Springs Reservoir. In less than three hours, the reservoir received more sediment than in the prior eleven years. It took crews more than

two months to clear the reservoir of logs, propane tanks, refrigerators, port-a-potties, and other debris.

When the pounding thunderstorm inundated the charred slopes, "it was like pouring water on concrete," said a local volunteer fireman.

"For this relatively small fire, the immediate water quality and clean-up costs were nearly a million dollars, and the estimated future cost is 15 to 20 million dollars to dredge our reservoir. We estimate the after affects of erosion will negatively affect water quality, and cost us $250,000 per year for at least ten years" said Chips Barry, head of Denver Water, in testimony before Congress, "While we knew that a forest fire could create erosion problems, we had in fact no real idea of what would happen."

Debris and sediment deposited in Strontia Springs Reservoir that supplies drinking water to Denver. The debris came from areas burned by the 1996 Buffalo Creek Fire. Photo by John A. Moody, USGS

Alluvial Fan Flooding

The mountains of the west, especially the Northwest, are located in "one of the most volatile fire-erosion areas in the world," according to one federal agency. Vegetation types designed to burn and an arid climate encourage fire, leaving burned slopes prime for erosion.

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This intermittent but steady cycle of fire and erosion helped form valleys and large alluvial fans that are home to millions. It's an age old process that's still happening.

Alluvial fans are composed of rock and debris deposited by floods. Gravity and moving water sweep debris through canyons, dropping heavier debris, like boulders, first and carrying sediment outward where it spreads in the shape of

a fan, usually at the mouths of canyons and watershed outlets. Fans can gently slope and may look like hillsides to the untrained eye.

Alluvial Fan. The 1996 Buffalo Creek Fire burned 12,000 acres in the mountains southwest of Denver, Colorado. As a result of this wildfire, a 100-year rainstorm in 1996 caused erosion upstream and deposition of this alluvial fan at the mouth of a tributary to Buffalo Creek. Buffalo Creek is flowing to the right at the bottom of the photograph.

Photo by R. H. Meade

Alluvial fan flooding is less predictable than flooding in valley bottoms. Heavy flooding and large debris flows can change the course of rivers and streams by cutting new channels, imperiling areas otherwise thought to be safe. Almost any neighborhood on an alluvial fan can be at risk and federal authorities say there is a tendency to underestimate the severity of flash floods and debris flows.

Again, predicting post-fire flooding is improving, but as the fatal Los Angeles County and Buffalo Creek floods show, there is no way to know exactly when and where post-fire flooding will occur.

But pre and post-fire hazard mapping is a start. It shows where planners, builders, and developers can exercise caution, or consider not building. BAER team reports and maps can help identify potential hazard areas. Using this, and other information, following the Hayman Fire, one county building department revisited the sites of burned and flooded homes. Homeowners who had been built on alluvial fans were asked to rebuild in safer areas.

Also in Colorado, the Jefferson Conservation District and the Colorado Geological Survey jointly mapped alluvial fan and highly-erodible soil areas, in the wildland urban interface, for a county planning department. The county uses the maps, and associated land-use policies, to assess and mitigate flooding and post-fire hazards before development and fire occurs.

"Some new developments may be located beneath active alluvial fan floodplains," said city council members in Colorado and California. "Most

communities don't have the knowledge or resources to identify these hazards or develop ordinances to address potential hazards."

"Most communities don't have the knowledge or resources to identify these hazards or develop ordinances to address potential hazards." said a city council member. Conservation Districts, NRCS, and others state can help local governments identify potential post-fire flooding hazards before the fire.

Conservation Districts, NRCS, state geological surveys, and professional engineers and geologists can help local governments identify potential post-fire flooding hazards before the fire.

Be aware of flood hazards no matter where you live, but especially if you live in a low-lying area, near water or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds, or low-lying ground that appear harmless before a fire can quickly become fast-moving waterways following fire and a small amount of rain.

Landslides

Landslides are a serious geologic hazard common to almost every state in the United States. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year.

What are landslides and what causes them?

Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Gravity is the force driving landslide movement.

Factors that allow the force of gravity to overcome the resistance of earth material to landslide movement include:

- Saturation by water;
- Steeping of slopes by erosion or construction;
- Alternate freezing or thawing.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In fire areas, a lower threshold of precipitation may initiate landslides. Another contributing factor to increased landsliding, after fire, is stream channel scour and erosion. This process removes or increases the slope of channel banks contributing to landsliding along the creek channel, or possible reactivates pre old landslides by removing the toe of the slide.

Additional factors that can contribute to landslides are:

- Weakness of the slope material;
- Unfavorable geologic structural conditions;
- Absence or scarcity of vegetative cover; and
- Ground shaking.

Landslide occurrences in the chaparral landscape are strongly related to the angle of repose for different soils, taking into account cover, root depth, and root strength. Landsliding activity, in chaparral, can greatly increase as a result of fire.

Areas that are generally prone to landslide hazards include existing old landslides; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes.

Debris Flows

Debris flows, often called mudslides or mud flows, are shallow landslides. The flowing mud carries rocks, bushes, and other debris as it pours down the slopes. They develop when water rapidly accumulates in the ground, during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or "slurry." They flow rapidly, striking with little or no warning at avalanche speeds. They also can travel several miles from their source, growing in size as they pick up trees, boulders, cars, and other materials.

A video of a fire related debris flow can be viewed at
http://www.usgs.gov/homepage/science_features/debris_flow_ca.asp video

Residents living directly downslope of mountainous wildfire areas should be aware that, in addition to life-threatening potential debris flows and other forms of mass movement, there is another, perhaps deadlier hazard-- debris flooding or mud flooding at and near the mouths of channels that drain burned-over, ashy slopes.

Studies have shown that, in the first few years following a wildfire, sediment yields and peak discharges increase greatly. Thus floods that incorporate enormous amounts of debris and mud washed off the burned hillsides could endanger occupants of dwellings near such drainage channels.

Disaster After the Disaster

A Deadly Debris Flow

Floods and debris flows may be less breathtaking than huge firestorms visible from space, but they pose a dangerous hazard. These hazards, which can be triggered by small amounts of rain falling on burned areas, are not fully understood and difficult to predict.

Debris flows contain small to large boulders, trees, and other debris. They can move with quick speed and for long distances.Flows typically follow streams and valleys destroying anything in their paths, for instance houses, roads, or bridges. Numerous floods and debris flows in the San Bernardino Mountains underscore the gravity of the problem. In 2003, months after massive fires, floods and debris flows hit Southern California killing fourteen.

Sadly, a lethal debris flow happened in Cable Canyon. Soon after fire swept across the steep mountains, rain fell on denuded hillsides above the canyon. The rushing runoff picked up and carried sediment, trees, and boulders down the canyon and into a campground. People sleeping in tents and campers were swept up and carried away in the debris. Several people were killed; demolished vehicles and trailers were found up to a half-mile downstream of the campground.

In order to better understand post-fire hazards and prevent future loss of life, the National Oceanic and Atmospheric Administration (NOAA) and USGS established a flood and debris-flow early warning system in Southern California. Warnings and watches are based on rainfall, topography, and other features likely to cause flash floods and debris flows in burn areas. (USGS, 2005) ***Information on the system can be found at http://www.wrh.noaa.gov/lox/hydrology/USGS.pdf***

Media and Community Education Ideas

• In areas prone to landslides, publish a special newspaper section, brochure, or newsletter with emergency information on landslides and debris flows. Localize the information by including the phone numbers of local emergency services offices.

• Report on what city and county governments are doing to reduce the possibility of landslides. Interview local officials about local land-use zoning regulations.

• Support your local government in efforts to develop and enforce land use and building ordinances that regulate construction in areas susceptible to landslides and debris flows. Buildings should be located away from steep slopes, streams and rivers, intermittent-stream channels, and the mouths of mountain channels.

• Four-fifths of flood victims die after walking or driving into moving water. The ***"TURN AROUND DON'T DROWN"*** campaign seeks to make people aware of what can happen when they drive into high water.

Sample brochures and additional information about the program can be found at http://www.srh.noaa.gov/tadd/.

A Cable Canyon home wrecked by the Christmas 2003 debris flow. Photo by Bruce Perry

Debris flow deposits in Cable Canyon. Two people were killed after a December 25, 2003 rainstorm. Photo by Bruce Perry

Four-fifths of flood victims die after walking or driving into moving water.

What to Do Before Storms

• Become familiar with the land around you. Learn whether landslides and debris flows have occurred in your area by contacting local officials, state geological surveys or departments of natural resources, and university departments of geology. Knowing the land can help you assess your risk for danger.

• Watch the patterns of storm-water drainage on slopes near your home, and especially the places where runoff water converges, increasing flow over soil-covered slopes. Watch the hillsides around your home for any signs of land movement, such as small landslides or debris flows, or progressively tilting trees. Watching small changes could alert you to the potential of a greater landslide threat.

• Replant damaged ground as soon as possible since erosion caused by loss of ground cover can lead to flash flooding, debris flows, and landslides

• Seek the advice of a geotechnical expert for evaluating landslide and debris flow hazards or designing corrective techniques to reduce landslide risk. A professional will be able to advise you of the best ways to prevent or reduce landslide risk, without creating further hazard.

What to Do During Storms

• **Stay alert and awake.** Many debris-flow fatalities occur when people are sleeping. Listen to a NOAA Weather Radio or portable, battery-powered radio or television for warnings of intense rainfall. Be aware that intense, short bursts of rain may be particularly dangerous, especially after longer periods of heavy rainfall and damp weather.

More deaths occur due to flooding each year than from any other thunderstorm or hurricane related hazard. Many of these casualties are a result of unsuspecting motorists who attempt to navigate flooded roads.

The National Weather Service now warns anyone who comes to a flooded roadway,
"Turn around... don't drown!" *TM*

What to Do During Storms

Stay alert and awake.

Stay out of the path of a landslide

• **Stay out of the path of a landslide** or debris flow saves lives. According to the California Geological Survey, the single most important action that should be taken by residents on rainy nights is NOT to sleep in lower-floor bedrooms on the sides of houses that face hazardous slopes. More than 100 Californians have been killed by debris flows during the past 25 years. Most of these 100 deaths occurred when debris flows buried persons who were sleeping in lower-floor bedrooms that were adjacent to hazardous slopes.

• **Listen for any unusual sounds that might indicate moving debris**, such as trees cracking or boulders knocking together. A trickle of flowing or falling mud or debris may precede larger landslides. Moving debris can flow quickly and without warning.

• If you are near a stream or channel, **be alert for any sudden increase or decrease in water flow** and for a change from clear to muddy water. Such changes may indicate landslide activity upstream, so be prepared to move quickly. Don't delay! Save yourself, not your belongings.

• **Be especially alert when driving.** Embankments along roadsides are particularly susceptible to landslides. Watch the road for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows.

• **Stay away from flood-prone areas**, including dips, low spots, valleys, ditches, washes, etc.

• **Do not attempt to cross a flowing stream.** It takes only six inches of fast flowing water to sweep you off your feet.

• Flooded roads could have significant damage hidden by floodwaters. **NEVER drive through floodwaters** or on flooded roads. If your vehicle stalls, leave it immediately and seek higher ground. Water only two feet deep can float away most automobiles.

• **Do not camp or park your vehicle along streams** and washes, particularly when threatening conditions exist.

Hazard Trees

The first step in making the forest safe is to remove trees that pose a hazard. Yet, burn areas are, on the whole, too large to remove all the hazard trees. Priority should be given to well-used roads and trails, and residential properties.

Fire victims usually want to remove all dead trees on their land. The charred trees stand as a constant reminder of the disaster and their loss. But, if left

standing, burned trees begin to rot and fall over within a few years. This helps the recovery process, but creates circumstances where falling trees or limbs can injure people walking or working in a burn area.

Hazard trees near roads should be removed as soon as possible. Private landowners should be encouraged to remove trees that may fall across public and private roads or utility easements. If hazard trees remain after BAER or EWP work is completed, long-term recovery plans should tackle this problem.

The following tips are some general suggestions for how to treat trees damaged by the fires. There will be many "hazard trees" in the areas that were burned. A "hazard tree" is generally considered to be a tree or part of a tree that has a high potential to fall and cause injury or damage to people or property.

If you have concerns a tree possibly will be a hazard, there are a couple things you can look for:

- Look at the trunk of the tree and determine if there are any heavily burned areas, hollow areas, or cavities. Then look at the base of the tree and determine if the fire has burned down into the trees root zone;

- Look up into the crown of the tree and determine if there are any partially burned large branches, snapped or burned through hanging branches… known as widow-makers…or if the tree has a broken or partially burned through top.

If the answer to any of these basic questions is yes, then the tree is potentially hazardous. When looking at any potentially dangerous tree, always stand uphill of the tree. Do not stand under a tree without looking up at the canopy for dangers first. If you have any doubts on whether a tree is hazardous contact a qualified professional. (CDF, 2005)

Before removing hazard trees, individuals or groups should contact the local state forestry department. Often, state foresters will identify trees that need to be removed or provide a list of qualified contractors that can mark and remove hazard trees.

A burned forest is full of dangers. A hazard tree is a tree or part of a tree that has a high potential to fail and cause injury or damage to people or property.

Facts About Hazard Trees

What is a Hazard Tree?

A hazard tree is a dead or damaged tree that can fall across a road, trail or property.

How to Identify Hazard Trees

- Visually check the stability of trees. Winds can quickly topple weakened trees or it may take several years. Be aware that wind patterns can change due loss of adjacent forest.

- Look for burns on the tree trunk. If the bark on the trunk has been burned off or scorched on 50% or more of the tree's circumference, it will not survive. Where fire has burnt deep into the trunk, the tree is unstable and should be considered dangerous.

- Look for burnt roots, including burned-out stump holes, by probing, with a rod, around the base of the tree and at least three feet away from the base. Roots are generally six to eight inches below the surface. If roots are burned, you should consider the tree very unstable, and it may be toppled by wind.

- Look into the crown of the tree and determine if there are any partially burned large branches, snapped or burned through hanging branches, if yes, the tree is a hazard.

- Look for insect activity (boring holes, frass, boring dust). This indicates that a tree is going to die and will likely is a hazard.

Seek professional assistance from forestry experts concerning hazard tree removal and measures for protecting fire-stressed evergreens from insects like bark beetles.

Photos show trees where roots have been destroyed by fire. Without roots as an anchor, wind can easily topple trees.
Photo: University of Arizona Cooperative Extension.

Recovery Challenges

Non-native invasive plant species -- weeds -- thrive on public and private lands in the wake of wildland fire, presenting several problems. These opportunistic plants compete with and can overtake native plant communities. In addition, their proliferation provides powerful fuel for wildfires, increasing the likelihood of and severity of future wildfires. Cheatgrass, for example, has spread throughout the West on degraded rangelands, increasing in density on burned areas. In the Great Basin ecosystem alone, one out of every three acres is either dominated or threatened by cheatgrass.

The appropriate harvest of fire-damaged timber can provide a means of recovering some of the economic value of forest stands and improving landscape health, but it is not a panacea for reducing wildfire risk. Removal activities that do not follow excellent environmental practices can add to the damage associated with fire-impacted landscapes. (USDA, 2000)

Timber Salvage

For a private landowner, with trees of commercial value, the decision to harvest trees killed or dying due to fire can be a difficult decision, but one that must be made rather quickly after the fire is out. But, to a large extent, local markets for commercial trees control the ability to harvest trees. In many areas, like Colorado and parts of Arizona, the commercial value of trees is low due to lack of local markets. Groups of landowners may be able to market salvage timber

better than a single landowner.

Once a tree dies, it quickly decays losing commercial value. The rate of decay depends on the tree species. White fir and Subalpine fir are quick to decay, while Ponderosa pine and Douglas-fir are more resistant and may take several years longer. Also, blue stain fungus, which does not weaken sound wood but decreases its value, can contaminate dead trees (UACE, 2005).

Salvage harvesting provides a number of advantages to private property owners. Income received from salvaged trees can help recoup financial losses and fund recovery projects.

Also, dead and damaged trees may increase the risk of future fires. Removing accumulated fuels reduces the risk of future fire in damaged areas. Harvesting of dead and damaged trees decreases the spread of insects and disease.

The salvage of timber can be a highly controversial subject. Some dead trees are needed for wildlife habitat and cover and return nutrients to the soil. While offering benefits, salvage harvesting must be carried out properly to avoid further resource damage. Burned areas are susceptible to soil compaction, increased erosion, and slope failure. Soil damage occurs when forestry best management practices not followed…too much soil is disturbed or the wrong equipment is used. Before salvaging timber, everyone should read "Wildfires and Salvage Logging" by Dr. Robert Breschta, et al.

Because of these risks, it is important that salvage harvesting be done with the help of a professional forester. A professional forester can be contracted to help a landowner sell trees, secure the best price, plan and execute the sale and harvest, and develop a reforestation plan. A professional forester can also assist in meeting federal, state or local regulations managing water quality, wildlife habitat, and land disturbance. For a landowner, neighbors and friends who have harvested timber before are good leads to registered professional foresters or you can consult the phone book yellow pages under the listings of "Forester, consultant." The Association of Consulting Foresters a list of registered consulting foresters in each state can be found at http://www.acf-foresters.com.

A Natural Resources Conservation Service program, the Environmental Quality Incentives Program (EQIP) provides assistance to agricultural producers who face threats to soil, water, air, and related natural resources on their land. Forest Stand Improvement (Thinning), Forest Site Preparation (removal of dead or dying trees), and Tree and Shrub Planting are some practices that may be used in a contract. Landowners who want to find out if they are eligible for these programs should contact their local conservation district. More information on

these and other post-fire grant programs can also be found in the grant section of the handbook.

To be eligible, the landowner must be an agricultural producer or have an approved Forest Management Plan or Forest Stewardship Plan before the fire. The plan is then amended to include reforestation.

Charred trees provide habitat for wildlife, including woodpeckers.
Photo: Ed Spence, NRCS

Timber Loss, Salvage, and Tax Implications

A loss of a forest stand on private property, from wildfire, may be claimed on a federal income tax form as a casualty loss. Calculating the amount that can be claimed as a deduction requires sound data that should collected by a professional forester. However, monies spent collecting loss data may exceed the value of any tax benefits.

If a landowner decides to replant burned areas, they may be able to claim a ten percent tax credit for reforestation expenses, up to a maximum of $10,000 per year. Fire victims should seek the advice of a tax professional for advise on the most tax advantageous method for selling timber. (UACE, 2005)

Salvage harvesting should be done with the help of a professional forester. A professional forester can help a landowner sell trees, secure the best price, plan and execute the sale and harvest, and develop a reforestation plan.

Trees for Trout

A lesson in Timber Salvage, Communication

It is hard for Coloradoans who experienced its wrath to say that anything good, other than a few lessons learned, came from the devastating Hayman Fire of 2002. And it might be even harder for some to imagine that a forward-thinking coalition of government officials, local conservation districts and groups, and private citizens were able use some of the smoking remains of what was a thriving forest before that terrible summer to improve fish habitat all over the watershed.

Fishing is a $3 billion dollar a year industry in Colorado, and wildlife management experts are always looking for ways to improve stream habitat conditions. It's not only good for the environment, but the economy as well. The kinds of streams that fishermen dream about—and probably fish, though they are noticeably silent on the issue—are crystal-clear with varied stream velocities. Anglers seek out creeks and rivers with eddies and holding pools where fish seek shelter from the faster mid-stream waters that bring food from upstream. But natural erosion processes and the effects of development in many areas have reduced stream depths and speeds over time.

Engineers have tried to reverse this trend by digging out the middle of some streambeds. But these projects, however successful, have proven to be expensive and, because of the heavy excavating equipment needed, often wreak havoc on the surrounding land. In the mid 1990s, the Forest Service began strategically placing rock structures in streambeds to alter current speeds and create eddies and holding pools. But around the same time, the Colorado Department of Wildlife began to notice that fish can be found in greater numbers in eddies and holding pools created by trees than those created by these "rock vanes." Not only does the introduction of trees provides stream ecosystems with a beneficial source of decaying biomass that rock structures cannot provide, each tree placed in a streambed creates an estimated 100 to 350 square feet of additional habitat.

The only problem is where to get the trees. The large trees needed for this kind of project are often hard to come by. The primary method of harvesting trees for streambed projects is called "toppling," which is essentially bulldozing the trees, with rootballs attached, leaving large holes and loose soil behind. This method often means sacrificing the quality of one ecosystem to improve another.

And then the Hayman fire left more than 150,000 acres of burned forestland in its wake. Post-fire discussions concerning the best ways to rehabilitate the area led to the idea of salvaging many of the burned trees for use in stream improvement projects, the Trees for Trout project was born.

By May of 2004—through the cooperation of Trees for Trout partners The Coalition for the Upper South Platte, US Forest Service, Colorado Division of Wildlife, Park County, Trout Unlimited, the Boy Scouts of America, and three local ranches—some 158 trees had been salvaged from the charred ruins of the Hayman blaze, toppled and transported for use in stream improvement projects. And as little as a year later, the effects of this project appeared to have left no mark on the land.

Salvage projects of this kind frequently run into opposition from environmental groups and forest resource managers. But since the biologists, hydrologists, soil and timber experts, not to mention community and conservation groups, were all on the same page before the fire, approval for the project came much quicker than it could have. Trees for Trout came into being because all concerned parties had gotten to know and trust one another before the Hayman fire. Alliances made before the fire led to the kind of trust and communication that made this program possible after the last embers were extinguished.

Source: Coalition for the Upper South Platte, Sally Moser, and Sean Cronin

Noxious Weeds

Severe fire substantially changes a watershed. Lack of vegetation on burned hillsides leads to flooding and soil erosion. Still, the most damaging and long-lasting result of wildfires can be the invasion and regrowth of aggressive noxious weeds, which vigorously compete with native plants for space and nutrients.

Often, desired plants will survive and resume growth soon after a fire. The ability of these plants to reestablish and thrive after fire is reduced by the existence of noxious weeds. Unfortunately, noxious weeds often thrive in recently burned areas. The roots of Canada thistle (Cirsium arvense) can penetrate the soil as deep as 22 feet. Because even the most severe fires typically damage roots only to four inches below the soil, these noxious weeds survive fire to compete with desired plants.

Fires expose ground surfaces, reduce shade and increase light, and create a flush of nutrients. Weeds flourish in these conditions. Wildlife habitat, livestock grazing, land stability and water quality may be compromised. Large infestations of noxious weeds are difficult, and costly, to manage.

Therefore, it is critical to have an integrated long-term weed management plan that includes diverse control methods. If an effective weed management program is not put in place desired vegetation may never be established or remedial weed control will seem never ending and be expensive. Managing the reestablishing vegetation in the most competitive manner and avoiding weed infestations are the best tools for managing weeds during recovery.

Prevention & Early Detection

While some annual weeds may help protect perennial grass seedlings, most are serious problems. Preventing noxious weeds from establishing in the first place is the most effective and least costly method of weed management.

Preventing establishment can be accomplished by:

- Limiting weed seed dispersal;
- Detecting and eradicating weeds early;

The most damaging and long-lasting result of wildfires can be the invasion and regrowth of aggressive noxious weeds

- Revegetating when necessary, and;

- Properly managing desired plants to prevent invasion.

Limit the Dispersal of Weed Seeds

Preventing or limiting seed dispersal is an important piece of weed management.

Seed dispersal can be reduced by:

- Using only certified noxious weed–free gravel, seed mixes, forage and mulch;

- Cleaning the undersides and tires of vehicles and heavy equipment before entering or leaving a burned area;

- Travel in burn areas should be limited to established roads. This limits seed dispersal by vehicles and soil compaction;

- Avoid weed-infested areas during the seeding periods. Weed seeds can be transported on boots, clothing and animals;

- During the seeding period, avoid moving livestock into weed-free areas from infested areas;

- Eradicating weeds before seeds develop and disperse.

Detection and Early Intervention

Early detection of new weeds is crucial in preventing noxious weed establishment. Through a systematic monitoring program, new and small patches of weeds can be identified and eradicated before they become large infestations. A large infestation is more difficult and expensive to manage than a small patch.

Many weeds can be fruitfully attacked when seedlings. For instance, Dalmatian toadflax (Linaria dalmatica) seedlings are poor competitors. But once established, toadflax is a fierce competitor and difficult to control.

Also, noxious weeds are less equipped to defend against controls during the early bud and fall regrowth stages. At these times, herbicides can kill or reduce the vigor of weeds. Herbicides are likely to be taken directly to the roots of weeds. You should take advantage of these periods and significantly enhance management efforts.

Revegetation

Many times, revegetation is needed to provide competition for noxious weeds. Burn severity and the extent of pre-burn noxious weed cover are key factors in deciding if revegetation is needed.

As a rule, the more severe the burn and the greater the degree of pre-burn noxious weed cover, the more likely the need for revegetation. If you decide to allow natural regeneration and not revegetate, monitor the area frequently for new weeds until the plant community has recovered. Afterwards, monitor for weeds occasionally.

The goal of revegetation is to speed recovery of a healthy and competitive plant community that uses most soil resources, leaving few for potential invaders.

Hallmarks of a good revegetation plan include:

- Using species adapted to conditions of the site. Conservation Districts, local extension agents, and Natural Resource Conservation Service field offices are good sources of information on the environmental and establishment requirements of seeded species;

- If an ash layer is absent, preparing a seedbed before and after broadcast seeding. Ash from the fire helps cover and retain broadcasted seeds. The wet/dry, freeze/thaw action of moisture helps work seeds into the soil while breaking down hydrophobic soil layers. Use a no-till drill if the site is accessible to equipment;

- Increasing seeding rates to:
    - Improve the chances of desired seeds' competing successfully with weeds, and
    - Increase the likelihood that adequate amounts of broadcast seeds find safe sites;

- Providing a protective mulch cover, such as native certified weed-free hay, to protect soil and seeds from erosion, to conserve soil moisture and to moderate soil temperatures. Native hay mulch can contain seeds of native plants, which help diversify the plant community.

After a fire, Conservation Districts and weed management agencies are invaluable help in obtaining pre-burn weed mapping; setting revegetation priorities; sharing of information and funding. These partners should be included in developing revegetation plans, as part of a collaborative process.

Many times, revegetation is needed to provide competition for noxious weeds. Burn severity and the extent of pre-burn noxious weed cover are key factors in deciding if revegetation is needed.

Properly managing desired plants to prevent invasion

If you intend to graze a recovered burned area, adopt grazing practices that encourage desired plant growth that will limit weed resources—light, water, and nutrients. Your grazing plan should promote the growth and vigor of the desired plant community and minimize the establishment and spread of noxious weeds.

As a general rule, domestic sheep prefer broad-leaved plants (forbs) to grasses, and cattle prefer grasses to forbs. Cattle, the dominant grazer in many ecologic systems, selectively forage grasses while usually neglecting forbs—including introduced and invasive forbs (noxious weeds). As a result, grasses are not as able to compete, with weeds, for limited soil, water, and nutrients. The problem can be mitigated, in many cases, by grazing cattle with domestic sheep.

A grazing management program should include encourage competitive plant growth, enhance and promote a healthy rangeland system.

Among the methods are:

- Defer grazing in burned areas until seedlings are well established. Avoid heavy grazing by determining and implementing proper stocking rates;

- When palatable, slow-maturing shrubs are recovering, do not graze until they have produced viable seeds;

- Alter the season of use: avoid grazing the same plants at the same time year after year;

- Rotate livestock between pastures to allow plant recovery before being repeated grazing;

- Outline the movement of livestock throughout the year.

State laws and noxious weed lists vary from state to state. Many states have local weed management districts or weed specialists that should be consulted for resources, potential funding, and regulatory requirements.

Detailed information on post-fire weed management can be found in the publication titled "Integrated Noxious Weed Management after Wildfires MSU Extension Bulletin #EB 160". The Montana State University publication can be found at: *http://www.montana.edu/wwwpb/pubs/eb160.html*

Often, lightly burned areas recover quickly after fire and reseeding is not necessary. Bluestem germinates after a low intensity prescribed burn in the Wichita Mountains National Wildlife Refuge. Oklahoma.

Photo courtesy USDA NRCS

Insects

Immediately following a fire many insects respond to the damage. They are part of the natural cycle and begin the process of breaking down the wood into nutrients that will be reused by future plants.

Bark beetles such as Ips, mountain pine, and Douglas-fir beetles burrow into still viable inner bark of burned trees and lightly burned trees that are still surviving. Brown boring dust at the base of the tree or resinous pitch tubes on the trunk will indicate their presence. Bark beetle multiple in burned trees and often spread well beyond the fire area. Healthy conifers, beyond the fire area, may need to be sprayed to prevent the spread of bark beetles.

Wood boring insects, such as the longhorned beetle, attack only highly stressed trees, so their spread to undamaged trees is of minimal concern. When visiting a burn area, you can hear the munching sounds of wood-boring larvae from several feet away. White "sawdust" at the base of a tree reveals that wood boring insects at work.

These are just a few of the insects that move into an area after a fire. Bark beetle populations may require monitoring and treatment to prevent their spread. It should be noted that bark beetles might have already been in the area before the fire. Forests that are stressed from prolonged drought and overcrowding are highly susceptible. The result is a forest with many dead "beetle kill" trees that are prone to fire.

Burned Area Rehabilitation (BAR)

Restoration and rehabilitation activities include longer-term actions to repair or improve lands that are unlikely to recover naturally from severe fire damage.

On federal land, burned area rehabilitation is non-emergency post-fire efforts (< 3 years) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire. Restoration is the continuation of BAR beyond 3 years. Information on the federal BAR process can be found at *http://fire.r9.fws.gov/ifcc/esr/BAR/BAR.htm*.

A long-term recovery plan includes rehabilitation strategies for lands burned within the fire perimeter and downstream impact areas.

By and large, the primary objectives of burned area rehabilitation are:

- To repair or improve lands unlikely to recover naturally from severe wildland fire damage by emulating historic or pre-fire ecosystem structure, function, diversity, and dynamics.

- Restore or establish healthy, stable ecosystems, even if these ecosystems cannot fully emulate historic or pre-fire conditions;

- Prevent or reduce the introduction of non-native invasive species;

- Protect human life, property, public health, and safety;

- Protect archeological resources; and

- Investment in hard-hit communities by using local contractors and the local workforce to the extent possible.

On private land, federal aid does not fully bridge the span of recovery. Local communities must fill the gap between short-term stabilization and ecosystem and community restoration.

However, if fire burned adjacent federal land, it is likely the Burned Area Emergency Response Team (BAER) conducted an analysis of fire damages throughout land impacted by the fire. A watershed assessment group assessed the overall watershed changes caused by the fire and developed a burn severity map. Archeologists inventoried potential damage to cultural sites as well as initiating a cultural resource damage assessment. A vegetation specialist evaluated and assessed fire damages and suppression impacts to vegetative resources, and identified values at risk associated with vegetative losses.

Wildlife biologists conducted an assessment of T&E species, in consultation with U.S. Fish and Wildlife Service. GIS specialists gathered the data layers necessary for stabilization and rehabilitation plans. An Operations specialist inventoried fire damaged fences and other structures, and developed specifications for their repair and replacement (USDI, 2006).

As a result the following reports may be available to help communities develop long-term rehabilitation and restoration plans, goals, and priorities:

- Soil & Watershed Damage Assessment
- Vegetation Damage Assessment
- Forest Damage Assessment
- Wildlife Damage Assessment
- Cultural Damage Assessment
- Faculty or Structure Damage Assessment

Examples of specific "long-term" actions or treatments might include:

- Correcting road drainage by realigning poorly designed roads, or culvert replacement/repair to manage water and soil movement after the fire;
- Temporarily fencing cattle and people out of sensitive burned areas;
- Planting or seeding native species;
- Reforesting desired tree species;
- Engineered erosion and sediment control practices;

• Chemical or mechanical treatment to reduce competition; and other efforts to limit the spread of invasive species.

Boring dust at the base of trees is a telltale sign of insects. The white "sawdust" in the photo indicates the presence of wood boring insects.

Photo: Ed Spence, NRCS

Shortly after the insects make their presence known, woodpeckers will move into the area to take advantage of the increase in food supply.

Helping Landowners Protect Homes and Property

After a fire, as rains fall and hazards loom, recovery assistance may be slow to appear and then disappear before recovery is complete. Often, private landowners are unsure about what to do and where to turn for help.

There are things that landowners can do to protect their property and reduce

After a fire, as rains fall and hazards loom, recovery assistance may be slow to appear and then disappear before recovery is complete. There are things that landowners can do to protect their property and reduce further damage.

further damage. Conservation Districts, the Natural Resources Conservation Service, and the local extension service, are available to answer questions and provide assistance to landowners as they recover from the aftermath of fire. It is important that landowners use a system of post-fire treatments and not rely on a single practice.

A few techniques that homeowners can use to avoid or reduce post-fire hazards include:

Contour Log Felling, Log Terraces, or Log Erosion Barriers

Contour log felling is a way to reduce the amount of water that runs down a slope by cutting trees so that they fall perpendicular to the main direction of the slope or along contour.

Contour log felling is used on burned slopes where there are a number of dead trees that have little alternative value. When the original ground cover is lost after a wildfire, the soil is at risk for erosion. Additionally, drainageways may flood more frequently due to increased runoff from the burned slopes. Contour log felling is a way to use the dead timber for some beneficial purpose. Consider leaving some dead trees for wildlife habitat.

Also, note that contour log felling in burned areas is dangerous due to a significant risk that trees may fall down or drop branches on workers with little or no warning. Logs or slash from the felling should not be placed in drainageways or swales. When unanchored, the logs or debris may be washed downstream, causing flooding or damage to homes and property and drainage or increased erosion.

Runoff and sediment on burned slopes can be reduced by felling standing timber (snags) along the contour, delimbing and anchoring the logs, and backfilling to create small detention basins.

Straw wattles are also widely used for rehabilitation, especially when the labor costs or risks for contour tree felling are high. They also slow the velocity of the runoff from rain, helping to prevent the development of rills and gullies.

Runoff Diversions

A diversion may be needed to handle surface runoff flowing onto property from upslope. For slopes steeper than two percent, or where large amounts of water may be expected, the diversion channel may require an erosion resistant lining. Water and debris should be directed to a safe, non-erodible outlet and never

How is Contour Log Felling Done?

Trees are cut so that the trunks drop across the slope perpendicular to the flow of water. Stumps should be left about 12 inches high to be used along with stakes or stable, standing trees at each end of the log to brace it from sliding downhill. Tree limbs are removed to the extent necessary for the log to lie flat on the ground, encouraging the collection of water and trapping debris moving down the slope.

A trench eight to 12 inches deep should be dug on the uphill side of each log to catch debris. This soil should be tamped into gaps between the log and the ground to prevent water from eroding under the log. For this practice to be most effective, enough trees must be felled to create a barrier that interrupts the movement of water down the slope.

How Effective is Contour Log Felling?

When there are 400 to 600 feet of logs available per acre (about 30 logs 20 feet long and 10 inches in diameter), contour log felling may significantly increase infiltration, add surface roughness, and replace some lost cover, thus reducing erosion potential. At best, contour log felling provides short-term protection on slopes that require reestablishment of permanent vegetation for long-term erosion control.

Contour log felling has little effect when logs are oriented up and down the slope instead of across it, when felled logs are not in contact with the soil, where the slope is steeper than 50 percent, and where the density of logs is less than 00 feet per acre.

Recommended Horizontal Spacing (feet)

Slope Gradient (%)	Low Fire Intensity	Med. Fire Intensity	High Fire Intensity
<5	250	160	130
5-10	200	120	90
10-20	120	60	40
20-50	60	30	20

directly onto the downstream slope itself. Never direct water onto adjoining property, including roads, without consulting the owners. Always consult a qualified engineer to design water diversion measures.

Before starting any work, it is important to know the location of both above ground and underground utility lines. The location of underground utility lines can be obtained by calling your local utility notification center or by calling your local utility companies. A list of utility notification center, by state, is included in the appendix. Also, do not release runoff onto septic leach fields or at the base of structural foundations.

Mulching

Mulching is the application of grass hay or straw as a protective cover over seeded areas. The purpose is to reduce erosion and aid in revegetation or protect bare soils that will be landscaped later.

Use this method on slopes that have a high potential for erosion. Mulch forms a loose layer when applied over a loose soil surface. To protect the mulch from movement by wind or water, it must be punched into the soil or covered with erosion control netting. The mulch should cover the entire seeded or bare area and extend into existing vegetation or be stabilized on all sides to prevent wind or water damage that may start at the edges.

Erosion Control Netting or Blankets

Erosion control netting is a temporary measure to protect the soil surface. It is usually made of a synthetic material that is laid and anchored over straw or other mulch to hold the mulch in place and protect it from wind and water damage. It reduces soil erosion and provides a good environment for vegetative regrowth. The material is photodegradable or biodegradable, so it will eventually decompose and is not a threat to the environment.

This practice is often used on areas that may erode near structures such as homes, roads, and bridges. Erosion control netting can be used on small, moderately steep, disturbed areas. Jute or coir netting can also be applied without mulch on flat sites for dust control and seed germination enhancement. However, it should not be used without mulch where runoff quantities are expected to be high. Erosion control netting is not appropriate in all situations, and the local Conservation District or NRCS office can help you decide if the use of netting is appropriate in your case.

Revegetation is the least expensive and most effective method of controlling erosion and invasive weeds over the long-term.

Situations when netting may not be appropriate include the following:

- Steep slopes with sandy soils;
- Steep slopes with many rocks on the surface; or
- Steep slopes with a large amount of burned vegetation remaining.

Revegetating After Wildfires

Loss of vegetation leaves land vulnerable to increased runoff, erosion, and sedimentation; encourages weeds; degrades habitat; and impairs forest regeneration. Revegetation is a good step to take toward controlling noxious weed invasion after a wildfire. For more information about weed suppression, you could also contact your county weed coordinators. Reestablishment of permanent vegetation provides long-term erosion control, protection, and site stability. This practice is the least expensive per acre. It directly addresses the resource concerns, and it is best suited to addressing concerns over larger areas.

In general, severely and moderately burned sites should be reseeded to decrease the likelihood of erosion and sediment movement down slopes, to discourage weed invasion, and to fulfill management objectives. Since lightly burned areas recover quite quickly from wildfire, reseeding is usually not necessary.

Grasses and forbs should be planted after the wildfire or ground disturbance when the soil surface is loose. In many areas, seeding in late fall or winter (even if there are a few inches of snow) improves success. The prime time to seed is immediately prior to the ground freezing. Trees or shrubs should be planted in the fall or early spring when plants are dormant.

One year of vegetative growth following reseeding after the Los Alamos fires. Species planted for erosion control and habitat improvement include prairie junegrass, slender wheatgrass, mountain brome, gambel's oak, and mountain mahogany.

Photo courtesy USDA NRCS

Contour Scarification

The upper part of the soil profile is tilled and mixed across the slope on the contour using small machinery or construction equipment. The purposes of this practice are to break up the hydrophobic characteristics of soil in moderate and severely burned areas, to aid in the establishment of vegetative cover from seed, to reduce runoff velocity, to increase infiltration, and to reduce erosion.

Contour scarification is used on burned upland areas with hydrophobic soil properties that are accessible by machines and will be stabilized with seeded vegetation. Slopes should be equal to or less than 0 percent to facilitate safe operation of machinery. Slopes with a stable rock face do not require scarification. Contour scarification is not used in swales, drainage ways, gullies, or other areas of concentrated flow. One hindrance to contour scarification is that there are often too many burned trees in the way to use equipment.

Sandbag Barriers

A sandbag barrier is an inexpensive, temporary barrier or wall, one to two feet high that is constructed by stacking sand-filled or earth-filled sandbags and placing them to divert mud and other debris away from buildings. However, these barriers do not provide protection from moderate to severe debris flows.

These barriers are used to protect building sites vulnerable to small mudflows from highly-erodible slopes that are partially or completely void of vegetation. This is an inexpensive, temporary protection method that can be used by homeowners before predicted rainfall. Sandbags deteriorate when exposed to continued wetting and drying for several months.

If the bags need to be used for more than a few months, cement can be mixed with the sand. The cement and sand mixture will harden when the bags dry.

Straw Bale Check Dam

These are temporary sediment barriers constructed of straw bales across very small drainages.

These temporary structures are used to slow runoff and reduce erosion. They are not intended to provide protection from large storm events or to control debris flows.

Straw bale check dam design limits are as follows:

Slope	Maximum Tributary Area	Maximum Slope Length
0-15%	1 acre	200 feet
15-20%	.5 acre	100 feet
>20%	Not recommended	

Straw bales work by decreasing water velocity and detaining sediment-laden surface runoff long enough for coarser sediments to deposit behind check dams. Decreased water velocity also reduces down cutting in ephemeral channels.

Straw wattles slow runoff and help trap sediment and were used after the Los Alamos fires to prevent erosion.

Photos courtesy USDA NRCS

Additional Resources

There are a number of erosion control measures that can be taken to lower the soil erosion hazard and protect property following a fire. After the fire is out, it's time to start making some decisions.

There are several good publications that discuss, in greater detail, issues property owners should consider following a wildfire and include:

- How to protect property from further damage due to erosion;
- Where to go for help and financial assistance;
- How remove or salvage trees that were lost or damaged;
- How to claim a casualty loss on your tax return, and;
- How to recover from wildfire damage to property.

These publications and other resources are listed below:

Recovering From Wildfire A Guide for Arizona's Forest Owners
http://ag.arizona.edu/pubs/natresources/az1294/

Wildfire Rehabilitation Assistance- what can you do to protect your home and property after a wildfire?
http://www.mt.nrcs.usda.gov/technical/fires/rehab.html

Wildfire Recovery Tips
http://www.wsu.edu/pmc_nrcs/Docs/Wildfire_Recovery_Tips.pdf

Wildfire Risk Reduction and Recovery Tips For Homeowners
http://plant-materials.nrcs.usda.gov/pubs/azpmsarwldfrrecover.pdf

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fire.r9.fws.gov/ifcc/esr/BAR/BAR.htm.

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Vandeventer, Paul. 2004. From Chaos to Community, Community Partners ®
www.CommunityPartners.org

Temporary structures, like straw bales and sandbags, are used to slow runoff and reduce erosion. They are not intended to provide protection from large storm events or to control debris flows.

Grant Funding for Rehabilitation Projects

Several governmental agencies have made available grant funds for environmental and community rehabilitation for areas effected by wildland fire. Listed below are several sources of federal funding options, but is by no means exhaustive. Check with local Conservation Districts and State Forest Services for sources of local and state funding.

Distribution of Receipts to State and Local Governments

Funding Agency: Bureau Of Land Management (CFDA #15.227)

Objectives: By various Laws, the Bureau of Land Management (BLM) shares revenue with State, county, and local governments from fees charged for sale or use of public lands, minerals, and vegetation. Payment amounts are determined by several codified formulas and supplements other Federal land revenue sharing payments that local units may be receiving. Payments may be used for any governmental purpose as specified in the various Public Laws.

Type of Assistance: Direct Payments with Unrestricted Use; Direct Payments for Specified Use.

Uses and Restrictions: Are specified in the various Public Laws.

Eligibility Requirements: No application is necessary. Local units that generate revenue from public land and resources will receive automatic payment distribution as computed in accordance with the Law for that distribution.
Beneficiary Eligibility: State and county governments in which Federal lands and minerals are located or have been acquired for purposes defined under Objectives.

Assistance Considerations: Formula and matching requirements: None
Information Contacts:

Distribution of Receipts Specialist, Bureau of Land Management,
BC- 621 Building 50, Denver Federal Center
Denver, CO 80225
Telephone: (303) 236-7135.
www.blm.gov

Forest Land Enhancement Program

Funding Agency: DOA, Forestry Service (CFDA #10.677)
Objectives: Provide technical and educational assistance and cost share for practices such as management plan development, tree planting, forest stand improvement, agroforestry implementation, water quality improvement and watershed protection, fish and wildlife habitat improvement, forest health protection, invasive species control, wildfire and catastrophic risk reduction, wildfire and catastrophic risk rehabilitation, and special practices approved within the State and by the F.S. Responsible Official.
Type of Assistance: Project Grants.

Eligibility Requirements:
Applicant Eligibility: State Forestry or equivalent State agencies. All States, territories, and possessions of the United States.

Beneficiary Eligibility: Landowners and managers of non-industrial private forestlands, non-profit organizations, consultant foresters, universities, other State, local and private organizations and agencies acting through State Foresters, equivalent State officials or other official representatives.

Most grants to the State forestry agency are approved when the State Priority Plan has been approved and funds are available.

Information Contacts:
Regional or Local Office: Allocated through State Forester or equivalent.
Visit http://www.stateforesters.org for a directory of State Foresters.

Forest Stewardship Program

Funding Agency: DOA, Forest Service (CFDA #10.678)

Objectives: To provide assistance to State Foresters or equivalent State officials for the delivery of information and professional assistance to owners of non-industrial private forest lands; for the forestation, reforestation, and active management of state and other non-federal forest land; and improved forest seedling production and distribution.

Type of Assistance: Project Grants.

Eligibility Requirements: Applicant Eligibility: State Forestry or equivalent State agencies, tribes, non-profits, and municipalities are eligible. All States, the District of Columbia, territories, and possessions of the United States may be eligible.

Beneficiary Eligibility: Landowners of non-federal lands, non-profit organizations, tribes and other State, local, and private agencies acting through State Foresters, equivalent State officials, or other official representatives are eligible.

Range and Average of Financial Assistance: $25,000 to $2,000,000. Average: $450,000.

Regional and Area Offices review proposals and grant funds.

Information Contacts:
Regional or Local Office: Refer to Appendix I for the Regional and Area State and Private Forestry offices of the Forest Service.
http://na.fs.fed.us/stewardship/

Schools and Roads Grants to Counties

Funding Agency: DOA, Forest Service (CFDA #10.666)

Objectives: To share receipts from National Grasslands and Land Utilization Projects with the counties in which the National Grasslands and Land Utilization Projects are situated.

Type of Assistance: Formula Grants.

Eligibility Requirements:
Applicant Eligibility: Counties within the States of the United States containing National Grasslands or Land Utilization Projects.

Beneficiary Eligibility: Counties within the States of the United States containing National Grasslands or Land Utilization Projects.

Formula and Matching Requirements: The amount paid shall represent 25 percent of the net revenues received from the use of the land during the preceding calendar year. Range and Average of Financial Assistance: $5 to $1,706,756. Average: $69,104.

Information Contacts: Contact the Fiscal Branch of the appropriate Forest Service Regional Office.

Schools and Roads Grants to States

Funding Agency: DOA, Forest Service (CFDA #10.665)

Objectives: To share receipts from the National Forests with the States in which the National Forests are situated.

Type of Assistance: Formula Grants.

Uses and Restrictions: To be used for the benefit of public schools and public roads of the county or counties in which the National Forest is situated.

Eligibility Requirements:
Applicant Eligibility: Grant recipients must be States (including commonwealths) or territories of the United States containing National Forest land.

Beneficiary Eligibility: States and territories.

Formula and Matching Requirements: The amount paid shall represent 25 percent of all moneys received during the preceding fiscal year from each National Forest. When a National Forest is in more than one State, territory, or county, the distributive share to each shall be proportional to its area therein.

Length and Time Phasing of Assistance: Approximately 75 percent of the estimated fiscal year's payment will be made on or about October 1 of each year. The final payment will be made on or about December 1 of each year. Range of Financial Assistance: $35 to $161,888,715.

Information Contacts:
Contact the Fiscal Branch of the appropriate Forest Service Regional Office

www.fs.fed.us

Urban and Community Forestry Program

Funding Agency: DOA, Forest Service (CFDA #10.675)

Objectives: To plan for, establish, manage and protect trees, forests, green spaces and related resources in and adjacent to cities and towns to improve urban livability; to link governmental, private, and grassroots organizations and resources to address environmental issues at the local, regional and national level; to engage people in citizen-based, grass roots volunteer efforts to assist in retaining and protecting their natural environment to provide a balance between quality of life and land consumption associated with urban sprawl., and, to improve the ecological function, and social and economic stability of cities and communities. To assist State Foresters, equivalent State agencies, interested members of the public and private non-profit organizations, in urban and community forestry programs in cities and communities.

Examples include but are not limited to tree inventories, tree planting, training and education for proper tree care, establishment of urban foresters in communities, etc.

Type of Assistance:
Project Grants. Most grants are approved on the basis of negotiated targets or objectives to be achieved. U&CF community grants are based on local needs and resources.

Applicant Eligibility: State Forestry or equivalent State agencies, interested members of the public, private non-profit organizations and others. All States, the District of Columbia and other territories and possessions of the United States are eligible.

Beneficiary Eligibility: State Forestry or equivalent State agencies, local governments, tribes, and nonprofit organizations, and other State, local and private agencies acting through

State Foresters, equivalent State officials or other official representatives as agreed by the State Forester, equivalent State agency, and the Secretary.

Information Contacts:
Contact Regional and Area State and Private Forestry offices of the Forest Service, Department of Agriculture
1400 Independence Ave., SW, Mailstop: 1123
Washington, DC 20250-1123.
Telephone: (202) 205-1657.
www.fs.fed.us

Conservation Reserve Program

Funding Agency: DOA, Farm Service Agency (CFDA #10.069)

Objectives: To protect the Nation's long-term capability to produce food and fiber; to reduce soil erosion and sedimentation, improve water quality, and create a better habitat for wildlife.

Eligible owners or operators may place highly erodible or other environmentally sensitive land into a 10-15 year contract. The participant, in return for annual payments, agrees to implement a conservation plan approved by the local conservation district for converting highly erodible cropland or other environmentally sensitive land to a long-term resource conserving cover i.e., eligible land must be planted with a vegetative cover, such as, perennial grasses, legumes, fobs, shrubs, or trees. The participant agrees to reduce the aggregate total of allotments and quotas by an amount based on the ratio of the total cropland acreage on each farm, to the total acreage on each farm subject to the CRP contract. Financial and technical assistance are available to participants to assist in the establishment of a long- term resource conserving cover.

Type of Assistance:
Direct Payments for Specified Use. Formula and Matching Requirements not applicable. Annual rental payments in cash or generic commodity certificates will be made for 10-15 years. FSA may provide certain incentives for restoring wetlands or other lands.
Range of financial assistance: $50 to $50,000; Average: $4,000

Applicant Eligibility:
An individual, partnership, association, Indian Tribal ventures corporation, estate, trust, other business enterprises or other legal entities and, whenever applicable, a State, a political subdivision of a State, or any agency thereof may submit an offer to enroll acreage.

Beneficiary Eligibility:
If their offer is accepted for enrollment, an individual, partnership, association, Indian Tribal ventures, corporation, estate, trust, other business enterprises or other legal entities and, whenever applicable, a State, political subdivision of State, or any agency thereof may earn benefits.

Information Contacts:
Contact county FSA office, Department of Agriculture www.nrcs.usda.gov

Emergency Conservation Program

Funding Agency: DOA, Farm Service Agency (CFDA #10.054)

Objectives: To enable farmers to perform emergency conservation measures to control wind erosion on farmlands, to rehabilitate farmlands damaged by wind erosion, floods, hurricanes, or other natural disasters.

Type off Assistance:
Direct Payments for Specified Use.

Uses and Restrictions:

Following a natural disaster, the county FSA committee determines, with concurrence from the State FSA committee, to make the program available in the county. Emergency cost- sharing is limited to new conservation problems created by natural disasters which, if not treated will impair or endanger the land, materially affect the productive capacity of the land, represent damage that is unusual in character and, except for wind erosion, is not the type that would recur frequently in the same area and will be so costly to rehabilitate that Federal assistance is or will be required to return the land to productive agricultural use. The Deputy Administrator for Farm Programs, FSA, must determine eligible drought situations for water enhancing measures.

Applicant Eligibility:
Any agricultural producer who as owner, landlord, tenant, or sharecropper on a farm or ranch, including associated groups, and bears a part of the cost of an approved conservation practice in a disaster area, is eligible to apply for cost-share conservation assistance. This program is also available in Guam, Commonwealth of the Northern Mariana Islands, Puerto Rico, and the Virgin Islands.
Beneficiary Eligibility: Any agricultural producer who as owner, landlord, tenant, or sharecropper on a farm or ranch, including associated groups, and bears a part of the cost of an approved conservation practice in a disaster area, is eligible to apply for cost-share conservation assistance. This program is also available in Guam, Commonwealth of the Northern Mariana Islands, Puerto Rico, and the Virgin Islands.

Assistance Considerations:
Length and Time Phasing of Assistance: Practice cost-share approvals are given on a fiscal year basis. The approvals specify the time that the practice must be carried out. Payment is by check or electronic funds transfer following completion of the measure.
Range and Average of Financial Assistance: $50 to $64,000. Average: $2,681.

Information Contacts:
Regional or Local Office: Farmers and forest owners are advised to contact their local county FSA office after a natural disaster has occurred to determine whether the program is available in the county and to determine eligibility for emergency cost-share assistance. Consult the local telephone directory for location of the county FSA office. If no listing, get in touch with the appropriate State FSA office listed in the Farm Service Agency section of Appendix I.
www.nrcs.usda.gov

Conservation Security Program

Funding Agency: DOA, Natural Resources Conservation Service (CFDA #10.921)

Objectives:
The CSP sets forth a mechanism to provide financial and technical assistance to promote the conservation and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes on Tribal and private working lands. Working lands include cropland, grassland, prairie land, improved pasture, and rangeland, as well as forested land that is an incidental part of an agriculture operation. The goal of CSP is to identify and reward those farmers and ranchers who are meeting the highest standards of conservation and environmental management on their operations and to support ongoing stewardship of private agricultural lands by providing payments for maintaining and enhancing natural resources.

Eligible applicants may offer eligible land on a portion of their agriculture operation to enter

into a five-year contract, or entire agriculture operation for a five to ten year contract. Subject to the acceptance of an offer by the Federal Government, the participant shall agree to participate as outlined in the CSP stewardship plan and contract. The contract will include appropriate stewardship, new practice, maintenance, and enhancement payments. Subject to the availability of funds, CCC will make stewardship, existing practice, new practice or enhancement payments at the rates specified in this contract after a determination by CCC than an eligible practice or activity has been established in compliance with the CSP plan of operations and in accordance with appropriate standards and specifications.

Type of Assistance: Direct Payments for Specified Use.

Formula and Matching Requirements: Payments may have as many as four components including a base conservation stewardship payment, maintenance payment, new practice cost-share payment, and enhancement payment. Payments will be made as described in the contract in return for the implementation and/or maintenance of a specified level of conservation treatment on all or part of the agricultural operation.
Length and Time Phasing of Assistance: The schedule of payments will be specified in the conservation stewardship contract based on calculations identified in the rule and sign up notice.

Eligibility Requirements:
Applicant Eligibility: An individual producer, partnership, association, corporation, estate, trust, other business or other legal entities controlling eligible lands. The term producer means and owner, operator, landlord, tenant or sharecropper that shares in the risk of producing any crop or livestock and be entitled to share in the crop or livestock available for marketing from a farm. Land enrolled in the Conservation Reserve Program, Wetlands Reserve Program, the Grassland Reserve Program pursuant to 16 U.S.C. 3838n, public land including land owned by a Federal, State or local unit of government is not eligible for enrollment in CSP and may not receive CSP payments.

Beneficiary Eligibility: An individual producer, partnership, association, corporation, estate, trust, other business or other legal entities controlling eligible lands. The term producer means and owner, operator, landlord, tenant or sharecropper that shares in the risk of producing any crop or livestock and be entitled to share in the crop or livestock available for marketing from a farm. Land enrolled in the Conservation Reserve Program, Wetlands Reserve Program, the Grassland Reserve Program pursuant to 16 U.S.C. 3838n, public land including land owned by a Federal, State or local unit of government is not eligible for enrollment in CSP and may not receive CSP payments.
www.nrcs.usda.gov

Emergency Watershed Protection Program

Funding Agency: DOA, Natural Resources Conservation Service

Objective: The purpose of the Emergency Watershed Protection (EWP) program is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.

Activities include providing financial and technical assistance to remove debris from

streams, protect destabilized streambanks, establish cover on critically eroding lands, repairing conservation practices, and the purchase of flood plain easements. The program is designed for installation of recovery measures. All applications must be submitted within 10 days of the disaster for exigency situations and within 60 days of the disaster for non-exigency situations. All EWP work must reduce threats to life and property. EWP funds cannot be used to solve problems that existed before the disaster or to improve the level of protection above that which existed prior to the disaster. EWP cannot fund operation and maintenance work, or repair private or public transportation facilities or utilities.

For Example:
In Calabasas, CA a fire started by an arcing power line burned nearly 13,000 acres in the Santa Monica Mountains in October 1996. The fire spread to the Pacific Coast Highway and threatened the nearby City of Malibu. Heavy winter rains threatened to choke streambeds with branches and limbs, endangering residents and private property. Responding to a request from the Santa Monica RCD, the Natural Resource Conservation Service provided $20,000 of Emergency Watershed Protection funds to clear debris and place sandbags to protect homes along seven drainageways.

Type of Assistance: Grants. NRCS may bear up to 75 percent of the construction cost of emergency measures. The remaining 25 percent must come from local sources and can be in the form of cash or in-kind services.

Applicant Eligibility: All projects undertaken must be sponsored by a political subdivision of the State, such as a city, county, general improvement district, or conservation district.

Information Contacts:
Contact regional or local offices of the NRCS
www.nrcs.usda.gov

Environmental Quality Incentives Program

Funding Agency: DOA, Natural Resources Conservation Service (CFDA #10.912)

Objectives: Technical, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands through the implementation of structural, vegetative, and land management practices on eligible land.

Type of Assistance: Both cost-share and incentive payments for specified use. Cost-share payments may be made to implement one or more eligible structural or vegetative practices. Incentive payments can be made to implement one or more land management practices. Fifty percent of the funding available for technical, cost-share payments, incentive payments, shall be targeted at practices relating to livestock production.

Conservation practices may be eligible for cost-sharing up to 75 percent of the total cost of establishing the practice. Incentive payments can be made for land management practices in an amount and rate that NRCS determines is necessary. Limited resource producers and beginning farmers may be eligible for cost-sharing up to 90 percent.

Range and Average of Financial Assistance: Cost-share and incentive payments are limited to $10,000 per person per year and to $50,000 over the length of the contract. Average contract payments are estimated to be $15,000.

Eligibility Requirements:
Applicant Eligibility: Agricultural producers who face serious threats to soil, water, and

related natural resources, or who need assistance with complying with Federal and State environment laws. A participant may be an owner, landlord, operator, or tenant of eligible agricultural lands. Limited resource producers, small-scale producers, producers of minority groups, Federally recognized Indian tribal governments, Alaska natives, and Pacific Islanders are encouraged to apply.

Beneficiary Eligibility: To be eligible the agricultural producers must be in compliance with highly erodible land and wetland conservation provisions and in compliance with the Adjusted Gross Income (AGI) payment limitations.

Information Contacts:
Contact regional or local NRCS offices
www.nrcs.usda.gov

Resource Conservation and Development

Funding Agency: DOA, Natural Resources Conservation Service (CFDA #10.901)

Objectives: To encourage and improve the capability of State and local units of government and local nonprofit organizations

In rural areas to plan, develop and carry out programs for resource conservation and development. Technical assistance is available only to RC&D sponsors within areas authorized by the Secretary of Agriculture for assistance. Technical assistance is available for the planning and installation of approved projects specified in RC&D area plans, for land conservation, water management, community development and environmental enhancement elements.

For Example: In Idaho homes that lie on the fringe of forests and rangeland face a continuing threat of fire that knows no boundary between private property and wildland. The West Central Highlands RC&D Council obtained funds to develop a Fire Education Corps. Five RC&Ds areas contracted with the Student Conservation Association (SCA) to put the Corps together. Fire Education Corps teams spent the summer of 2001 conducting home safety evaluations and providing homeowners with fire prevention techniques, using the nationally recognized FIREWISE protocol, a program for fire education sponsored by a coalition of state and federal agencies. The teams concentrated their efforts in interface areas where fires might start and spread to homes that were surrounded by dense dry fuels.

Type of Assistance: Advisory Services and Counseling. When financial assistance is available, local or State agencies must provide land rights needed for the installation of all projects. RC&D grant assistance (up to 25 percent not to exceed $50,000 of the total project cost) may be provided for a project. Local or State agencies generally must provide ten percent of the total cost and be responsible for any needed operation and maintenance. Loan assistance may be provided for the local share of project cost.
Applicant Eligibility: State and local governments and nonprofit organizations with authority to plan or carry out activities relating to resource use and development in multi-jurisdictional areas. This program is also available in Puerto Rico, the Virgin Islands, Guam and Mariana Islands.

Beneficiary Eligibility: State and local governments and nonprofit organizations within areas designated as RC&D areas by the Secretary of Agriculture with authority to plan or carry out activities relating to resource use and development in multi-jurisdictional areas.

Information Contacts: Contact local or regional

schedule of payments will be specified in the conservation stewardship contract based on calculations identified in the rule and sign up notice.

Eligibility Requirements:
Applicant Eligibility: An individual producer, partnership, association, corporation, estate, trust, other business or other legal entities controlling eligible lands. The term producer means and owner, operator, landlord, tenant or sharecropper that shares in the risk of producing any crop or livestock and be entitled to share in the crop or livestock available for marketing from a farm. Land enrolled in the Conservation Reserve Program, Wetlands Reserve Program, the Grassland Reserve Program pursuant to 16 U.S.C. 3838n, public land including land owned by a Federal, State or local unit of government is not eligible for enrollment in CSP and may not receive CSP payments.

Beneficiary Eligibility: An individual producer, partnership, association, corporation, estate, trust, other business or other legal entities controlling eligible lands. The term producer means and owner, operator, landlord, tenant or sharecropper that shares in the risk of producing any crop or livestock and be entitled to share in the crop or livestock available for marketing from a farm. Land enrolled in the Conservation Reserve Program, Wetlands Reserve Program, the Grassland Reserve Program pursuant to 16 U.S.C. 3838n, public land including land owned by a Federal, State or local unit of government is not eligible for enrollment in CSP and may not receive CSP payments.

Information Contacts:
Contacts the local or regional NRCS office
http://www.nrcs.usda.gov

Infomation in the section was taken from the **NACD Catalog of Selected Federal Grants and Assistance Supporting the National Fire Plan**