summer 2003

Fire & Fuels

in southwest colorado

Working Together

Making Southwest Colorado a Safer Place to Live

By Laurie Robison and Pam Wilson

Southwest Colorado experienced a record-setting wildfire season in 2002. The human-caused Missionary Ridge fire quickly became the largest fire in the area's history at 70,485 acres, and captured the attention of every resident for almost two months.

There were eight fires in excess of 100 acres in size, four of them human-caused, and the Durango Interagency Dispatch Center sent firefighting resources to 340 fires between March 13 and October 8. Thirty-one of the 340 wildfires in southwest Colorado were human-caused.

Fire is an important part of the forest ecosystem in southwest Colorado. Prescribed fires and some lightning-caused fires can be useful tools for fire managers when conditions are appropriate. But unplanned, human-caused fires are undesirable — they tend to occur when fuels and weather are driest, temperatures are high, and firefighting resources are stretched thin.

Southwest Colorado is a desirable place to live and as more people make this area their home, we find more people recreating in the forests, more homes in the wildland-urban interface, and a higher probability of human-caused fires. Factor in record drought conditions and fuel build-up that will take years to mitigate successfully, and we have a situation that causes a great deal of concern.

A recently thinned BLM parcel in the midst of the Forest Lakes subdivision, north of Bayfield.

We can't prevent lightning-caused fires, but we can lessen the intensity and the damage by treating lightning-prone areas. This means thinning forested areas or creating buffer zones, especially those in the wildland-urban interface — where public and private lands meet.

On the other hand, with everyone's help, we can prevent human-caused fires. Each year fires are started by carelessness: abandoned or poorly extingushed campfires, cigarettes thrown out the car window, kids playing with matches and lighters, and inadequate spark arresters on four-wheelers and other vehicles. And those are just the more typical ways wildfires start.

Last year it was so dry the atypical happened. A fire started from a tooth on a power saw blade that chipped off and landed in vegetation; another fire started from an electric fence designed to keep weeds in check. When it's hot and dry, think the unthinkable. Before you do something in the heat of the day, in the middle of fire season, ask yourself – could this start a fire? Be smart, be responsible, think it through first.

You also need to be smart and responsible about your home. You're the one who chose to live here. You're the one who wanted a home in the woods. What you do to create defensible space around your home is the single most important factor when it comes to saving it from wildfire. Obviously, there are no guarantees when a powerful force of nature is involved, but there are things you can do to increase the odds that your home will survive.

We saw many examples in Durango and throughout the West last summer that defensible space does help protect your home. It gets the fire out of the tree crowns and back on the ground, where firefighters can control it better.

With assistance from the Office of Community Services at Fort Lewis College, five counties in southwest Colorado now have Community Fire Plans. These plans are helping the Forest Service and BLM prioritize where to conduct their fuel-reduction efforts. These agencies want to be good neighbors — if you live next to federal lands and have a large build-up of fuels near your home that you think needs to be treated, let them know.

The drought of the last several years has left our trees in a weakened condition, making them susceptible to insects and disease. Experts say we still have a ways to go to recover from the drought, so be thankful for the recent rain and snow — but don't become complacent. Do your part to help protect your home, your neighbor's home, and our forests.

Inside

Helping Agencies, Helping Communities

The National Fire Plan

After the 2000 fire season, which burned 2.3 million acres of National Forest System land, the most in 91 years, the U.S. Department of Agriculture and U.S. Department of the Interior released a report that became the basis for the National Fire Plan (NFP). This plan increased Forest Service funding by $1.8 billion and was designed to:

1. Ensure adequate firefighting resources,
2. Rebuild communities damaged in the fires of 2000 and rehabilitate fire-damaged ecosystems,
3. Work with local residents to reduce fire risk and improve fire protection, and
4. Reduce fuels in forests at risk from catastrophic fire effects, especially those near communities.

Managers at the San Juan Public Lands Center focused first on ensuring adequate firefighting resources, which includes not just firefighters but also support personnel. At the PLC this includes two fire prevention and education specialists, a fire information officer, a fire ecologist, a landscape architect, GIS support, and the San Juan Hotshot Crew.

At the field offices, the support personnel include hydrologists, archeologists, and wildlife biologists. These people help plan fuels-reduction projects, and may also assist in prescribed burning or wildland firefighting.

The Dolores Public Lands Office has three engines, with a crew of five people.

The Columbine Public Lands Office has one engine with a crew of five people and one hand crew of 10 people that performs initial attack on wildland fires.

The Pagosa Public Lands Office has one engine with a crew of five and this year has added a 7-person fuels crew that will be scouting potential areas for fuels-reduction treatments, and laying out treatment units.

With adequate staffing in place, managers then began looking at ways that the agencies could offer community assistance. Through the Office of Community Services at Fort Lewis College, and with the cooperation of the Colorado State Forest Service, local fire departments, volunteer fire departments, and interested citizens, Community Fire Plans were developed for five counties. These collaboratively developed plans offer both local and federal land managers a tool to assist them in planning future fuels-reduction and education efforts. Southwest Colorado is one of the first areas of the country to have such plans.

The original partnership continues to grow and expand to include new partners, like local nonprofit organizations. In April, these groups banded together to raise awareness and provide education oppportunities for Fire Prevention and Education Month.

Local and volunteer fire departments have benefited from the NFP through Community Assistance Grants, which provided them with the financial resources to obtain or upgrade equipment and personal protective gear, allowing them to better work side-by-side with federal firefighters as the number of wildland fires increases.

The NFP has provided local, state, and federal agencies with the people, equipment, and partnership opportunities to create healthier forest conditions. However, the wildland fire risk remains high in many areas because of fuels build-up due to decades of fire suppression, extended drought conditions, and the growing wildland-urban interface.

Working Towards Healthy Forests and Healthy Communities

Community Fire Plans Created

By Pam Wilson

The National Fire Plan advocated the creation of community action plans to deal with hazardous fuels.

In 2001, the Forest Service, BLM, and Colorado State Forest Service partnered with the Office of Community Services at Fort Lewis College to work with local fire managers and interested citizens to develop Community Fire Plans for Montezuma, Dolores, La Plata, Archuleta, and San Juan Counties. The plans were completed in the spring of 2002. These collaboratively developed plans:

- describe the community;
- relate fire risk to where people live, work, and play;
- reflect community values;
- describe potential actions to reduce fire risk;
- describe needs of local and volunteer fire departments; and
- provide federal agencies a foundation to implement the NFP.

With the exception of San Juan County, all the counties mapped areas they felt were at some degree of risk from wildfire, using criteria such as density and type of vegetation; access, both to water and properties; fire department response time; and subdivision locations. The fire plans also identify:

- strategies for protecting community values such as watersheds, residences, and recreation and economic resources;
- strategies private landowners can use to reduce wildfire risks;
- local needs for fire suppression equipment and training;
- potential public/private lands fuels-demonstration projects that illustrate fuels-mitigation techniques and results; and
- public education strategies.

Mike Preston, federal lands liaison with Montezuma County, says the Community Fire Plan has been a big asset to Montezuma County. "We are moving ahead with all the recommendations in the plan," he said.

The plans are available from the Office of Community Services and on the Web at: www.southwestcoloradofires.org.

Community Fire Plan Accomplishments

- *Community Wildfire series* — articles on issues related to wildfire hazard and mitigation
- Colorado Counties Inc. Workshop in May 2002
- Federal monies to Colorado State Forest Service to hire additional mitigation specialists, to help with homeowner assessments
- Montezuma County requirements for Wildfire Mitigation Plans for new developments
- Establishment of "demonstration" sites in Archuleta, La Plata, and Montezuma Counties
- One-stop shopping for information on defensible space, wildfire hazard and mitigation issues, fire information, Missionary Ridge Rehabilitation efforts, and more on the Web at:

www.southwestcoloradofires.org

Community Assistance

Local Fire Departments and Homeowners Receive Grants

By Dan Ochocki, Colorado State Forest Service

Two very important aspects of Community Assistance under the National Fire Plan, approved by Congress in Fall of 2000, involved grant opportunities for both rural fire departments and private landowners.

Volunteer Fire and Rural Fire Assistance Grants

In 2002, all federal and state land management agencies (USFS, BLM, NPS, BIA, CSFS) contributed funds to provide grants to 13 local Fire Protection Districts and Sheriff's Offices throughout the five-county southwest Colorado region. Over $76,000 in matching grant dollars was distributed to:

1. Provide wildland firefighting training.
2. Purchase personal protective equipment (PPE) for firefighters to assure they are protected with the best possible equipment as they battle wildfires.
3. Purchase much-needed equipment such as tools, hose, nozzles, etc.

The grant dollars were all cost-share grants, typically requiring a 50-50 match by selected recipients. Hopefully, additional funding will be available for 2003.

Western States Wildland-Urban Interface Grant Program

To provide an incentive for rural landowners to take steps to reduce fuels build-up around their homes, cost-share grant money was made available. Requests submitted by applicants were reviewed, prioritized, and awarded by a statewide committee. In southwest Colorado, $54,700 in grant dollars was awarded to six projects involving over 60 landowners. The grants were used to assist landowners in:

1. Tree thinning, to reduce fuel available to a wildfire.
2. Creating defensible space, both to protect the home and allow firefighters a relatively secure place to defend a home if a wildfire approaches.
3. Tree pruning, to eliminate "ladder fuels."
4. Disposing of slash, to reduce the available ground fuel.

Last fall (November, 2002) grant applications were solicited for 2003 projects. Eighteen individual landowners and 18 separate subdivisions submitted grant requests. Grant-award decisions have not yet been made for 2003.

Grant applications are available in the fall from the Colorado State Forest Service.

Restoration Forestry

Returning Fire to the Forest

By Gail Binkly

Forests thrive on disturbances like fire, insects, and disease. Disturbances affect and are affected by the structure and composition of the forest. Disturbance maintains diversity in the forest, by creating a mosaic of vegetation communities and wildlife habitats. Without disturbance, forests would lose diversity and be less resilient and less healthy ecosystems.

In most cases, restoring forest health and reducing fire risk go hand in hand in ponderosa-pine forests. Though the two goals may differ somewhat, they can often be achieved simultaneously by using the same methods, experts say.

"If you look at stands where restoration treatment has been done, you'd get pretty much 100 percent agreement that you've reduced the fuels and fire risk as well," said Phil Kemp, forester with the Dolores Public Lands Office.

Bob Frye, supervisory biological scientist with the Pagosa Public Lands Office, agreed. "Where possible, our philosophy is that the best fuels-reduction work is pine-restoration work," he said.

In the ponderosa stands that cover much of the San Juan and other forests of the West, restoration means returning the ecosystem to pre-European condition.

Tree-ring data, historic photos of sites before logging, and other evidence indicate that ponderosa forests of the past had far fewer trees per acre than today's. Instead of dense stands of small trees choked by thick oak brush, the old forests had widely spaced clumps of trees of varying sizes and ages. Between them were grassy meadows with a variety of vegetation for wildlife.

Widespread fires ceased around 1880 in this area, concurrent with Euro-American settlement. Large (landscape-scale), low-intensity surface fires were first stopped by heavy grazing and logging, and later by fire suppression. The combination of these elements has left forest ecosytems out of whack.

"Those (historic) pine stands had frequent fires," Frye said. "The ladder fuels (such as shrubs and scrub oak) never had a chance to get really established."

But throughout most of the 20th century, forest managers squelched fires and encouraged intense logging, dramatically altering the land's ecology.

"That's the way they were taught," Frye said. "In the past, they tried to manage for maximum fiber production, which created even spacing and even-aged tree stands."

The effects of fire exclusion are complex, according to Roz Wu, fire ecologist for the San Juan Public Lands. The most affected forest types are those that had high-frequency, low-intensity fire regimes, like ponderosa pine, warm/dry mixed-conifer stands, and possibly some piñon-juniper stands. Prior to settlement, most of these forests burned once a decade, so they have missed many fire cycles since the end of the 19th century. These forests now typically experience less frequent but higher-intensity fires, as evidenced by the last 10 years of fires in the West.

Restoring fire in upper-elevation spruce-fir forests may be more of a political issue than an ecological one. These forests are not as likely to burn without factors such as drought, high temperatures, low relative humidities, and wind present. Under such extreme conditions, ponderosa pine and other low-elevation forest types could be experiencing large crown fires at the same time, which could make it difficult for land managers to allow fires inthe spruce-fir to burn.

Fortunately, the same methods land managers use to improve forest health also reduce the risk of catastrophic wildfire. Thinning overcrowded trees results in bigger, more robust remaining trees that can resist low-level fires and are spaced so flames can't jump from crown to crown.

The lack of shrubs and the openess of stands in this forest on the west side of the Continental Divide are due to the periodic, low-intensity fires that occurred in the 19th century. circa 1908

Prescribed burns reduce dead fuels on the ground and thin the ever-present oak brush and other shrubs, which can carry fire into treetops.

These treatments also improve wildlife habitat for many creatures on the San Juan National Forest's list of "sensitive species," those whose populations are in decline, Frye said. "Their habitat needs are such that most require a very open-growing pine forest with large trees. That's one of the reasons we feel restoration is the way to go."

Prescribed burns were used as early as 1974 for fuel reduction on the San Juan, said Frye. Later, more burning was done, but foresters realized it wasn't sufficient to create healthy forest conditions, and began to include mechanical tree-thinning in their treatments.

Now, foresters have embraced both methods, using timber sales to help with tree-thinning. But today's logging operations are different than in the past, with loggers taking small-diameter trees and leaving older, bigger pines.

"When you mention a timber sale, most people visualize clearcuts," said Frye. But that's not the norm for ponderosa forests today. Results of restoration forestry and fuels-reduction treatments can be viewed at a number of demonstration sites across the San Juan Public Lands. Most are pleased by the scenic meadows and clumps of vigorous trees.

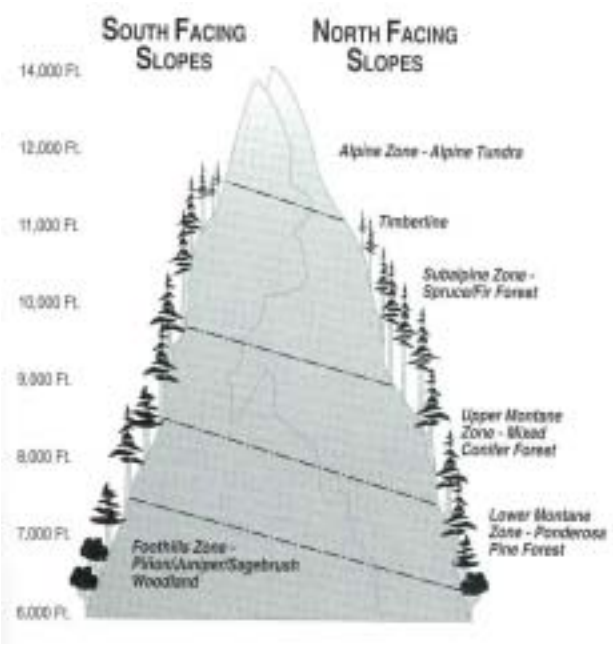
All San Juan Public Lands offices have planned prescribed burns planned for this spring and fall, depending on conditions.

Burns are often 1,500-2,000 acres in size and may take several years to complete. "We go big for a lot of reasons," Frye said. "It's more natural, it's more effective if you want to change fire behavior, and it's more cost-effective."

All burns are following the same general prescription and seeking the same ends: healthier forests that are less likely to sustain the sort of catastrophic wildfires that marked 2002.

Fire's Footprint

Different Forests, Different Fires



SPRUCE-FIR

Subalpine forests of Englemann spruce and subalpine fir at higher elevations.

The limited fire history data available suggests that wildfires prior to this century only occurred every 300-500 years because of high moisture and mild temperatures in the subalpine. During severe droughts however, fires that start in these forests can result in stand-replacement events, as evidenced by remnants of the Lime Creek Burn of the late 1800s on Molas Pass. These stand-replacement fires are nature's way of regenerating this forest type.

MIXED-CONIFER

Upper middle-elevation forests where pines give way to moist ecosystems of Douglas-fir and white fir trees.

Fires prior to 1900 may have occurred here on the average of every few decades. Research also suggests that suppression of fire has resulted in an increase of white fir in the understory, increasing the ability of wildfires to spread and intensify.

PONDEROSA PINE

Middle-elevation forests typified by an understory of Gambel oak with ecosystems adapted to dry summers.

Prior to 1900, these forests burned very frequently (on an average of every 6-30 years). Many towns and cities are in or next to this life zone. Prescribed burning on public lands during spring and fall reintroduces the benefits of fire and reduces the threat of a devastating fire.

PINON-JUNIPER

Arid, low-elevation areas where hardy species of trees are interspersed with desert shrubs.

Data and experience show that when fire burns here, it is often a "stand-replacement" event, where everything is charred. This kind of fire occurred at Mesa Verde National Park in 2000 and 2002. Today's piñon-juniper stands have dense canopies of even-aged trees, a situation that allows fires to burn in a destructive, dangerous manner.

Reducing Fuels

It's All in the Prescription

By Gail Binkly and Pam Wilson

Reducing fuels means three things:

1) removing "ladder fuels," which are shrubs and small trees that will help a fire that starts on the ground run up a tree,

2) opening up stands of trees so that the canopy cover is not continuous, and

3) removing ground fuels like pine needles, cones, and dead branches, so that a fire has less fuel.

The two key factors in determining how the work will be done are the type of vegetation and the type of fuel reduction needed. Land managers use prescribed fire or thinning treatments, which can be mechanical or hand.

These tools may be used separately or together, depending

on the area involved and the land manager's objectives. For example, in particularly dense stands of timber, it would be unsafe to burn without first removing some of the smaller underbrush. After thinning, fire managers might go back in and conduct a prescribed burn, to remove the needles and grasses from the forest floor.

Hazardous fuels in the wildland-urban interface will usually be treated either by hand thinning or with the hydromower, whereas fuels farther from interface areas may be treated with prescribed fire or a combination of thinning and prescribed fire. Wildland fire use or prescribed natural fire, which is when a lightning-caused fire start is allowed to burn, is a tool used in remote areas, such as roadless areas or Wilderness.

Fuel-treatment efforts are generally focused on ponderosa, piñon-juniper, and oakbrush. Communities such as aspen and spruce-fir don't burn as readily or as often as the pine forests.

In addition to reducing the fire danger, fuel treatments can also improve wildife habitat. Creating openings in dense stands of trees allows more sunlight and water to reach the grasses, forbs, and shrubs that deer, elk, and other wildlife depend upon for forage.

Fuel treatments also help reduce competition between trees for water and important nutrients that will help them fight off insects and disease.

The goal is to create healthy, diverse stands of trees and shrubs, interspersed with openings, that produce both cover and food for a variety of species, as well as to reduce the fire hazard.

The Forest Service and BLM are hoping to treat about 12,000 acres of hazardous fuels in 2003: 6,000 with mechanical methods and 6,000 with prescribed fire.

Hydromowing

A hydromower, one of the newest tools, is like a giant lawn mower that grinds vegetation into smaller pieces. It can easily handle material up to 8 inches in diameter and can cover an acre an hour, depending on the density of the vegetation, according to Randy Lewis, BLM fuels specialist. It's ideal for use with sagebrush, scrub oak, piñon pine, and juniper.

The mower spews the ground-up material ahead of itself and travels on top of the mulch, reducing surface disturbance. "The mulch is such a good cushion that the mower can actually be used in archeological areas," said Lewis. "We've had some cases where erosion is damaging a site and we've taken the mower in there and the mulch slows down the erosive forces." The mulch also benefits the soils by retaining water and providing cover for sprouting seeds.

Most of the mechanical treatment on public lands in southwest Colorado is being done with a hydromower. One reason is the cost: a hydromower costs about $150-$175/acre, compared with $300-$350/acre for hand thinning. A hydromower can also treat more ground than a crew cutting trees and brush with chainsaws.

The hydrowmower does have its limitations: the machine can't be used on steep slopes, and operators have to be careful how and what they mow, Lewis said. "We encourage equipment operators to run them in a mosaic pattern, leaving more natural-appearing clumps and clearings as well as a diverse mixture of plant species, ages, and sizes."

After mowing, the area is usually seeded with native grasses. Seed has been provided by the Colorado Division of Wildlife Habitat Partnership Program, Rocky Mountain Elk Foundation, and the Montezuma-Dolores Habitat Foundation.

The mower is used primarily in piñon-juniper stands found on much of the lower-elevation BLM lands, Lewis said, but a mower was recently used successfully on some dense thickets of very small ponderosa pines on the Pagosa Ranger District.

Thinning

When larger timber needs to be thinned, a commercial logging operation is ideal. According to Phil Kemp, a forester at the Dolores Public Lands Office, that's often the case with southwest Colorado's dense stands of ponderosa pine, the most volatile fuel among the higher-elevation trees.

Loggers don't clearcut, they remove trees according to a prescription set by land managers that is designed to improve the ecosystem by thinning overcrowded stands. The prescription is based on research and findings from the Ponderosa Pine Project, an effort involving Montezuma County, the Forest Service, and local loggers. The project, which started in 1995, showed that ponderosa forests were healthier if thinned and then burned with low-intensity fires.

"We're taking the lessons learned in the ponderosa pine demonstration project and incorporating those concepts into our regular timber-sale program," Kemp said.

After a thinning operation, prescribed burns may be used to reduce material on the ground and knock back oakbrush, giving new trees, grasses, and forbs a chance to sprout.

In smaller treatment areas or near homes, thinning may also be accomplished by hand crews. This past fall, firefighters from the San Juan Hotshot Crew and Dolores Public Lands Office cleared shrubs and dead piñon on almost 60 acres surrounding the Anasazi Heritage Center, in an effort to protect the AHC and its neighbors from an unwanted fire.

Prescribed Fire

Low-intensity fires, set and carefully monitored by fire crews, are used to improve forest health and reduce "ladder fuels," the shrubs and other plants that can carry flames up into tree canopies and turn a manageable wildland blaze into a catastrophic crown fire. Prescribed burns are a useful tool but can be conducted only when conditions, or the prescription, are just right.

"We've got a lot of parameters regarding humidity, wind speed, moisture levels, time of day," said Ron Klatt, fire management officer for the Columbine Public Lands Office. Fire managers usually look to the spring and fall to conduct prescribed burns.

Most prescribed burns on the San Juan Public Lands are conducted in middle-elevation ponderosa pine forests, which depend on fire for ecological health.

Prescribed fire is the most economical fuel-removal tool, costing from $50-$75 an acre, depending on terrain and complexity of the fuels. It is also the most effective tool for treating a large number of acres.

Due to the lingering drought, fire managers were able to burn only about 3,100 acres in 2002, two-thirds of which were from the Log Chutes burn just outside Durango. If conditions are right, fire managers hope to burn around 6,000 acres this year.

Fires Started Naturally, Managed for Resource Benefits

Wildland Fire Use

By Laurie Robison

Managing wildland fire on public lands can be a complex undertaking. Although not all fires are good, the days are past when fire managers automatically extinguish all wildfires. Today's fire experts recognize that fire can be beneficial and necessary to the forest ecosystem. For this reason, when a lightning fire starts in a remote area, fire officials may decide to monitor rather than suppress the fire. This is called Wildland Fire Use.

> "It's not a tool that can be used everywhere. We don't want the public to feel threatened by it."
>
> **Ron Klatt,**
> **Fire Management Officer**
> **Columbine Public Lands Office**

When local conditions are favorable and fire managers believe the fire will burn the way they want it to for that particular forest type, they'll monitor the fire and allow it to function in its natural ecological role. Fires of this nature return nutrients to the soil, open up overgrown forests to more sunlight, and provide new growth for food and habitat. Wildland Fire Use is especially effective in wilderness and roadless areas.

Even before a fire starts, land managers designate areas that would be appropriate for, and benefit from, Wildand Fire Use. Extra resources, such as hotshot crews and Incident Management Teams, are often brought in to help monitor these fires. Wildland Fire Use is just one more tool in the fire manager's tool box. Like prescribed fire and mechanical treatments, Wildland Fire Use carries out beneficial fuels reduction and habitat restoration — but within limitations.

"It's not a tool that can be used everywhere. We're not going to apply it next to a community," said Ron Klatt, Fire Management Officer, Columbine Public Lands Office. "We don't want the public to feel threatened by it."

Many things need to be considered before deciding to designate a fire as Wildland Fire Use. Factors taken into account include time of year, forest type, fuel loading, fuel moisture, drought, fire activity, topography, and weather. Once the decision has been made to take advantage of the Fire Use strategy, managers follow a predetermined plan and continuously observe fire behavior, weather, and other elements to encourage a favorable outcome.

If the criteria for Wildland Fire Use are not met, a fire is designated a wildfire and appropriate suppression action is taken. In 2002, there were no Fire Use fires on the San Juan Public Lands because conditions were too severe.

Wildland fire management, which includes the prevention, control, and use of wildland fire, is a process affecting us all.

Prevention is education and other actions that reduce unwanted wildland fires.

Control is action taken on unwanted wildland fires to protect life, and to reduce damage to resources and property.

Use is the application of wildland fire to meet specific objectives, such as restoring a forest or improving the diversity of the vegetation.

Taking Flight at Durango's Airtanker Base

Last season was a banner year at Durango's Airtanker Base. On July 9, the base moved into a new facility adjacent to the airport, which has the capability to load five air tankers or more in rotation. The old base could handle only three. And fortunately for people in southwest Colorado, an air tanker was stationed here for the first time.

Over 22 airtankers used the base last summer, and between them they:

- logged 750 hours of flight time on 71 fires;
- flew 737 missions in seven states;
- saved homes in six subdivisions, in addition to those around Missionary Ridge; and
- dropped 1.8 million gallons of retardant.

The P-3 Orion (Tanker 22) will be back at the base this summer. It won't be available before June 1, however, due to an airport runway reconstruction project beginning in mid-April. Until the runway is ready, Tanker 22 will be stationed at Grand Junction. This will be the only airtanker assigned to Colorado this year and we anticipate its use to be heavy throughout both regionally and nationally.

Fire and Rain

When Lightning Strikes

By Ann Bond

Be careful what you wish for if you're wishing for rain, because, in the Southwest, you'll also get thunderstorms. Along with badly needed moisture, they bring the threat of lightning, the cause of 65 percent of all Western wildfires.

A high-tech system of three dozen Automatic Lightning Direction Finders (ALDFs) helps track lightning strikes across the West. These stations can immediately detect and plot 85 percent of all cloud-to-ground lightning strikes. The stations that watch over southwest Colorado are in Monte Vista and Grand Junction.

Within a second, the lightning detectors filter out other electrical signals, like cloud-to-cloud strikes and electromagnetic "white noise," and record the time, angle, strength, and number of strokes. The information is transmitted via microwave or satellite to the BLM National Interagency Fire Center in Boise, Idaho. There, a computer triangulates incoming signals and plots individual strikes on maps.

"Each strike is as different as each snowflake," said Greg Pearson, NIFC lightning coordinator. "As each strike resonates, the ALDFs record a unique signature, or fingerprint, that can be detected separately from another strike occurring even a half second later."

Within minutes, the lightning data are on the way to fire dispatch centers and weather services, including the Durango Interagency Fire Dispatch Center, which watches over an area stretching east to west from Wolf Creek Pass to the Utah border, and north to south from Silverton, Colorado, to the New Mexico border. Valuable information on nearby storms in other states also comes in from ALDFs in Gallup, New Mexico; Cedar City, Utah; and Kingman, Arizona.

"The maps are very helpful in tracking storms," said Mark Lauer, San Juan Public Lands Center Fire Management Officer. "We know in advance what's headed our way, so we can preposition firefighting resources."

Staff at the Durango Interagency Fire Dispatch Center are often responsible for moving hundreds of firefighters and support staff, dozens of fire engines, plus airtankers and helicopters, in dozens of different directions.

"As soon as we get the lightning map, we put up a plane," Lauer said. "In the meantime, we begin to preposition our crews and engines closer to problem areas."

The maps are kept for future reference, to aid in determining whether a fire is human or naturally caused. "Some strikes will ignite fuels and sit in the ground undetected for a week to 10 days before they catch fire," Lauer said. "They'll smolder till conditions allow them to pop up."

There were over 300 lightning-caused fires in southwest Colorado last year.

See the Map of Proposed Fuels-Reduction Projects for 2003 on the San Juan Public Lands

Red Trees Mean Dead Trees

Beetles, Beetles, and More Beetles

By Gail Binkly

When visitors to southwest Colorado first see the thousands of red-brown, dying piñon pines standing along area highways, they're astonished. Locals, however, are growing sadly inured to the fact that countless trees are succumbing to an epic invasion of tiny bark beetles called *ips* beetles (*ips confusus*) or pine engraver beetles.

"I'm not seeing anything that gives me any hope [that the number of *ips* beetles will decline soon]," said Phil Kemp, forester with the Dolores Public Lands Office. "Extended cold temperatures would have killed a number of the beetles, but we didn't experience that this year."

Western Pine Beetle Eating Ponderosa Pines

Now, foresters are beginning to worry that another insect could wreak havoc on southwest Colorado's ponderosa pines. The Western pine beetle, *dendroctonus brevicomis*, is killing a growing number of trees.

"We're definitely starting to see an increase in Western pine beetle-caused mortality," said Kemp. "The most obvious place is in the Hermosa area, north of Durango. Another area is on private land near Summit Lake in Montezuma County, he said.

Western pine beetles are similar to piñon *ips* beetles in many ways. Both species fly to trees and attack them by boring through their bark to the soft phloem layer beneath. Both live most of their lives under the bark, eating, mating, and laying eggs that become larvae, pupae, and eventually more beetles. The mature insects emerge back through the bark and fly on to other trees.

Both species are native and are present in forests all the time, attacking trees weakened by age, lightning strikes, or fungal infections. Normally, the beetles are kept in check by woodpeckers and flickers; Western pine beetles are even eaten by certain other insects. Also, healthy pines – both ponderosa and piñon – can usually resist the bugs' attacks by "pitching them out," exuding sticky resin that suffocates the burrowing beetles. But a prolonged drought can weaken trees of all sizes and ages, so that they have little pitch and the bugs are able to take over.

In the face of a widespread infestation, forest officials' options are limited. Biological controls such as birds and predatory bugs can't begin to cope with the massive beetle invasion, said Roy Mask, an entomologist with the Forest Service's Gunnison Service Center. "We have so much forest susceptible to bark beetles right now that … biological controls can't keep those burgeoning populations in check," Mask said.

Preventive spraying with insecticides can save individual trees before the beetles take hold, but is impossible to use forest-wide. "Private landowners can use sprays," said Mask. "That's one tool that's very, very effective in protecting individual trees. But it's not something we could use on a large scale out in the forest because of the cost and the large number of trees."

Kemp said the BLM is proposing to spray piñon trees at a few sites, such as the Anasazi Heritage Center near Dolores and near certain ruins on Canyons of the Ancients National Monument, west of

Cortez "where there are individual trees that are in a picnic area, in front of a building, something like that."

A more effective method of forestalling a beetle invasion in the ponderosa pine forests is selective thinning of overcrowded stands, Kemp said. "The best preventive we've found is to thin the stands before we ever have an epidemic," he said. "It tends to reduce the risk of these stands being invaded." The remaining trees receive more moisture, nutrients, and sunlight, which strengthens them and helps them fight off insects and disease. Ideally, timber sales can be used to thin the overcrowded stands and help pay for forest restoration work, Kemp said.

But while the beetle invasion in the ponderosa pines is still in its early stages, the piñon-beetle epidemic is raging out of control, leaving thousands of acres covered with dead trees that pose a huge fire hazard.

Fire Danger Increases

"The downside, in addition to just losing the trees, is that the ignition potential for wildfire will be significantly increased," Mask said. While it might seem that dead trees are little different than trees with just 2 or 3 percent moisture — as some were at the height of last summer's drought — Mask said the dead ones do increase the fire danger.

"Anytime you have that much dead material, the ignition potential is always much higher," he said. "In the piñon forest it takes a lot of wind to get a wildfire going, but the possibility of something spreading from an ignition in that dead material is much greater."

Federal agencies cannot possibly cut and remove all the dead piñons on public land, but will concentrate on areas where the potential for catastrophe is greatest, Mask said. "Most of the emphasis is going to be on the wildland-urban interface, where subdivisions butt up against national forest, BLM, or state lands," he said. "A lot of the forest is susceptible to bark-beetle attack and to stand-replacing wildfire. We have to focus our limited resources where we can do the most good, and one of those places is in the wildland-urban interface."

FAQs about the Pine Engraver Beetle

(Ips confusus)

How do I know if a tree is infested with beetles?
Most prominent is the fading of needles from green to straw-color, later turning red and then brown. Pitch tubes (these are multiple, small, popcorn-shaped masses of pitch scattered on the trunk where the beetles entered the tree) may be visible; and sawdust may be present in bark crevices, branch crotches, and on the ground around the base of the tree.

Once a tree is infested with beetles can it be saved?
No. But don't be too hasty to cut down a tree if needles have turned on only a branch or two.

Once a tree turns brown can it be saved?
No.

How can I prevent an infestation?
With the magnitude of beetle kill in the Four Corners area, it may be impossible to completely prevent infestation. Important trees around homes and other key locations can be protected by preventive spraying with insecticides labeled for bark beetle prevention. Spraying should be done in the warmer months, with the first treatment in April (before the beetles emerge), a second in July, and a third around Labor Day in September.

I want to create defensible space around my home. When is the best time to cut trees?
Freshly cut green trees can attract bark beetles, thus the ideal time to cut is in the colder months, when the beetles are not flying. The need to create defensible space around your home is more important however than the potential attraction of insects. Consider spraying key or favorite trees nearest your home, and continue with your mitigation work. The cutting of dead trees will not attract beetles.

How should I dispose of cut trees and slash?
Beetles can remain inside logs over winter and emerge the next spring. If you cut up the wood for firewood, it's best to cover the stacks with clear plastic and bury the edges so no beetles can escape. In winter this method can trick beetles into coming out under the solar-warmed plastic, and then they freeze at night.

Infested wood can also be treated with insecticides, chipped, buried, or hauled to a site at least one mile from any piñon trees.

For more information contact the Colorado State Forest Service at 970-247-5250 or check out the Web at:

www.ext.colostate.edu/pubs/insect

After the Fire

Missionary Ridge Rehabilitation

Immediately following last year's Missionary Ridge Fire, the Forest Service began emergency stabilization work to reduce runoff and erosion problems resulting from the burned area. Of the $4.5 million the Forest received to complete a Burned Area Emergency Rehabilitation (BAER) Plan and associated work, about half was spent on immediate emergency stabilization efforts — work designed to prevent additional damage and minimize threats to life and property.

Those efforts included the building of log erosion barriers on 4,719 acres and seeding of 23,644 acres. Early snows and cold temperatures brought a halt to other efforts, like culvert replacement on Missionary Ridge and Pine River Roads.

Long-term rehabilitation involves the repair of structural improvements or restoration of lands that are unlikely to recover naturally from wildland fire damage. For example, noxious weeds are opportunistic and come in readily after a fire. Forest employees will be monitoring and treating weed areas.

This year additional hazard trees will be removed on the east side of Vallecito Reservoir and along the East Vallecito Road. The campgrounds will not open this season. Trails may be reopened this summer after dangers are assessed and trail corridors cleared of obstacles. Trail users will be alerted by signs at trailheads that hiking in the burned area will still carry a significant risk of falling trees, missing trail segments, and the possibility of debris flows.

Straw mulch at the Valley Fire

New culvert on Missionary Ridge Road

Building sand erosion barriers in the Weminuche

Log erosion barriers near Lemon Dam

Signs

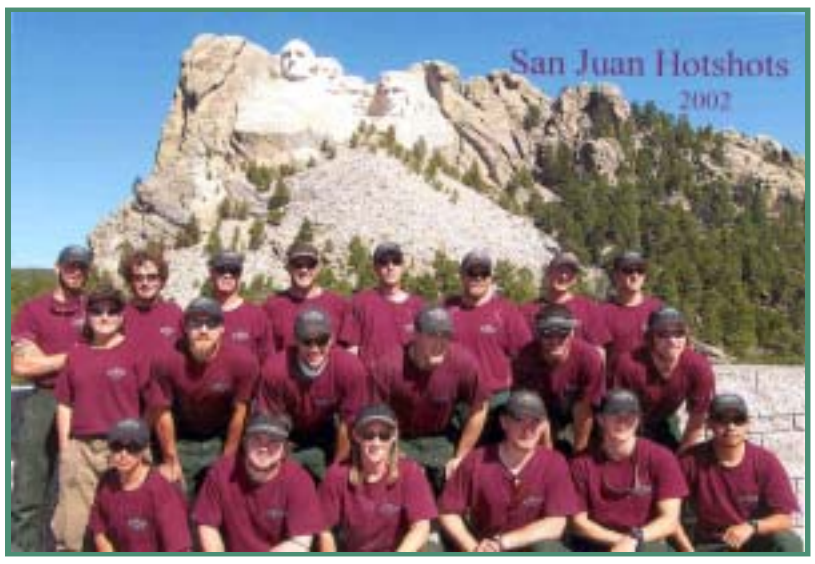
Additional BAER Work Planned for 2003

- further hillside stabilization to help protect homes in the Vallecito area
- continued operation of early-warning weather stations
- landslide-assessment monitoring and mapping (in conjunction with the Civil Air Patrol and La Plata County Office of Emergency Management)
- erosion control efforts on trails in the burned area
- culvert installation on Missionary Ridge and Pine River Roads
- possible reseeding of up to 18,000 acres of severely burned lands
- reconstruction, if needed, of log erosion barriers

Long-Term Rehabilitation Projects Planned for 2003

- begin removal of hazard trees along Missionary Ridge Road
- work to make other roads in the burned area safe for travel
- invasive-plant treatments
- insect and disease control
- water development restoration (for wildlife and livestock)
- fence repair
- seed collection and planning for reforestation
- rehabilitation of fire lines

Hotshot Crew Earns Certification



By Pam Wilson

Last spring, Durango became home to the 20-person San Juan Interagency Hotshot Crew, one of five such crews in Colorado and 92 in the U.S., but the first ever in southwest Colorado. Hotshot crews are professional wildland fire suppression teams specifically trained, organized, and equipped for rapid response to wildfires. Hotshot crews are often referred to as the backbone of the fire resources. They hike into fires on the most steep and rugged terrain and are prepared to spend two days without additional support.

As a national resource, the crew may respond to natural disasters, as well as wildland fires. During the off-season, part or all of the crew will assist with the implementation of hazardous fuels reduction projects and prescribed fires, both locally and regionally.

In April 2003 the San Juan Hotshots were officially certified as a Type I crew. "Being a brand-new crew, they really felt it was important to do their best and to prove themselves during their first year," said Crew Superintendent Shawna Legarza. And the crew succeeded. Their certification comes within a year of the crew's formation. The crew is considered experienced and flexible enough to handle assignments in initial attack, structure protection, and large burnouts.

To decide whether to certify the crew, a seven-person Operations review panel looked at the crew's accomplishments over the past year, from supply ordering, local personnel support and the hiring of personnel to performance reviews received on fires. In addition to firefighting competency, crew members were also interviewed about their ability to work together in difficult situations — an important factor in their line of work. "We had great performance reviews on fires, which reflected how well the crew was able to pull together during the intense fire season," said Legarza.

In 2002 the crew worked on the Missionary Ridge Fire, as well as 12 others in five states. During the fire season, hotshot crews work, eat, and live together. They are required to be available 24 hours a day, 7 days per week and must be available within two hours of a call. The San Juan Hotshots live and train at the Engineer Guard Station north of Durango, and are proud to be the highest-elevation hotshot crew in the Nation.

Making Your Home and Property Fire Safe

What Are You Waiting For?

If you've read all this before and you've created defensible space around your home — bravo! You've done a great thing for yourself, your family, and your community. If you've read all this before and you haven't done anything — what are you waiting for? A wildfire? It'll be too late then.

If it seems overwhelming, just start small and do what you can, when you can. Start at your house and work your way out. Simply raking the pine needles and leaves away from your house will help. Then, trim tree branches up ten feet from the ground, clean out your gutters, move your firewood away from the house, remove dead leaves, cut brush and small trees, leave large trees widely spaced, with 15 feet between tree crowns. Work on your defensible space bit by bit and, before you know it, you'll have that survivable space around your home.

When you thin trees on your property, competition is less fierce, so sunlight, nutrients, and water will be more plentiful for the trees that remain. Your little neck of the woods will be healthier and happier. And there could be an added bonus: you might sleep better at night during fire season.

1. Design/Construction

- o Consider installing residential sprinklers
- o If building a new home, build away from ridge tops, canyons, and areas between high points on a ridge
- o Build your home at least 30-100 feet from your property line
- o Use fire-resistant materials
- o Enclose the underside of eaves, balconies, and above-ground decks with fire-resistant materials
- o Try to limit the size and number of windows in your home that face large areas of vegetation
- o Install only double- or triple-paned windows
- o Make sure that electric service lines, fuse boxes, and circuit breaker panels are installed and maintained as prescribed by code
- o Use qualified professionals to perform electrical maintenance and repairs

2. Access

- o Identify at least two exit routes
- o Construct roads that allow two-way traffic
- o Design driveways and roads to allow access for large emergency vehicles
- o Design bridges to carry heavy emergency vehicles, including bulldozers on large trucks
- o Post clear road signs to show traffic restrictions such as dead-end roads, and weight and height limitations
- o Make sure dead-end roads and long driveways have turn-around areas wide enough for emergency vehicles
- o Construct turnouts along one-way roads
- o Clear flammable vegetation at least 10 feet from roads and five feet from driveways
- o Cut back overhanging tree branches above roads
- o Construct fire barriers such as greenbelts or fuelbreaks
- o Make sure that your street is named or numbered, and a sign is visibly posted at each street intersection
- o Make sure that your street name and house number are not duplicated elsewhere in the county
- o Make sure your house address is easily visible from the road

3. Roof

- o Remove branches within 10 feet of your chimney
- o Remove dead branches overhanging your roof
- o Remove dead leaves and needles from your roof and gutters
- o Install a fire-resistant roof. Contact your local fire department for current roofing requirements.
- o Cover your chimney outlet or stovepipe with a nonflammable screen of ½ inch or smaller mesh

4. Landscape

- o Create a "defensible space" by removing all flammable vegetation at least 30 feet from all structures
- o Never prune near power lines. Call your local utility company first
- o Landscape with fire-resistant plants
- o On slopes or in high-fire-hazard areas, remove flammable vegetation out to 100 feet or more
- o Space native trees and shrubs at least 10 feet apart
- o For trees taller than 19 feet, remove lower branches within six feet of the ground
- o Maintain all plants by regularly watering, and by removing dead branches, leaves, and needles
- o Before planting trees close to any power line, contact your local utility company to confirm the maximum tree height allowable for that location

5. Yard

- o Stack woodpiles at least 30 feet from all structures and remove vegetation within 10 feet of woodpiles
- o Locate propane tanks at least 30 feet from any structure and maintain 10 feet of clearance
- o Remove all stacks of construction materials, pine needles, leaves, and other debris from your yard
- o Contact your local fire department to see if open burning is allowed in your area; if so, obtain a permit if necessary

6. Emergency Water Supply

- ☐ Maintain an emergency water supply that meets fire department standards through a community water/hydrant system; a cooperative emergency storage tank with neighbors; or a minimum storage supply of 2,500 gallons on your property
- ☐ Clearly mark all emergency water sources
- ☐ Create easy firefighter access to your closest emergency water source
- ☐ If your water comes from a well, consider an emergency generator to operate the pump during a power failure

Defensible Space

10 Reasons People Don't Do It

1. I didn't know I should.
2. It (wildfire) won't happen to me.
3. It's not my responsiblity — I pay taxes.
4. I don't have the time or money.
5. If I lose my house, my insurance wil cover it.
6. It won't look good.
7. If it were important, my insurance company would give me a break on my premium.
8. It's wrong to cut trees.
9. I don't have an easy way to get rid of the stuff.
10. It's not my house.

5 Reasons They Should

1. Firefighter safety.
2. Fire hazard reduction can increase your property value.
3. Your neighbors will appreciate it — your work will protect them too.
4. Insurance companies may challenge a claim or cancel coverage.
5. Living with fewer trees is better than living with no trees.

A New Take on an Old Issue

Fire Restrictions on San Juan Public Lands

By Pam Wilson

Land managers have long been frustrated by the difficulty of applying fire restrictions on lands that range from 6,000-14,000 feet in elevation. Often, when fire danger begins to increase and the need for some level of restrictions arises, you can still find snow at the higher elevations.

This year the San Juan Public Lands Center, which manages Forest Service and BLM lands in southwest Colorado, is trying something new in an effort to better accommodate those using public lands.

Lands managed by the three public lands offices has been divided into two zones, low and high. The zones are defined by existing landmarks — roads, trails, or other on-the-ground discernible features. When it becomes necessary to institute restrictions, first they will be applied in the low zone. If conditions warrant, restrictions will later be instituted in the high zone.

"We hope this will better accomodate public lands users by letting them do the activities they enjoy, be it having a campfire, cutting firewood, or riding their dirt bike," said Mike Znerold, acting Forest Supervisor/Center Manager.

Maps of the zones will be available at our offices in Durango, Pagosa, Bayfield, and Dolores, as well as at local Visitor Centers and on the Web.

Since this way of managing restrictions is new, we'd like your feedback. If we have to go to fire restrictions this summer, please let us know what does and doesn't work for you about the new restrictions. Call the Public Lands Center at 970-247-4874.

Stages of Fire Restrictions

Stages indicate the severity of wildfire danger and corresponding restrictions that are put in place to address the situation. The need for restrictions may be triggered by weather, occurrence of both natural and human-caused fires, fire behavior, and/or safety.

For the San Juan Public Lands, managers will look at 10 different factors. When four or more of the factors or conditions exist, we will consider going to Stage 1 restrictions; if six or more exist we will consider Stage 2 restrictions; and if seven or more exist, Stage 3 restrictions will be considered.

Stage 1: Restrictions limit campfires to designated campgrounds and allow smoking only in cleared areas.

Stage 2: Restrictions usually prohibit all open fires and limit smoking to vehicles and enclosed buildings.

Stage 3: Restrictions prohibit entering part or all of certain public lands.

Each of these stages may also include restrictions on chainsaw use, vehicle use, or other items that could cause fire danger.

Restriction orders are tailored to meet a specific fire threat in an area at a particular time, so you may encounter different restrictions in different units. A quick call to a public lands office may prevent disappointment or a change in plans.

"People Aware Are People Who Care"

Educational Videos Available

After The Fire

This video alerts residents to the dangers still facing them in the aftermath of the Missionary Ridge and Valley Fires last summer. Viewers will learn ways to protect their home from flooding and fire, what to do about driving in flood-prone areas, and other safety messages. The video highlights safety measures taken by the county and the Forest Service, and measures local residents can take.

Protecting Your Home From Wildfire

Learn how to make your property safer from the threat of wildfire by creating defensible space around your home, and where you can get information and assistance.

Stop by the San Juan Public Lands Center in Durango for your free copies.

Fire-Safe Recreation

Camping/Campfires

- Make sure it's legal to have a campfire before you make one.
- Use established fire rings. Keep burning material inside the fire ring and all other flammable materials at least 30 feet away.
- Have water and a shovel on hand to extinguish a campfire.
- Always extinguish cigarettes in an ashtray or other appropriate container.
- **NEVER** leave a campfire, barbeque, or portable stove unattended.
- Use caution when operating all portable cooking or lighting devices.
- Thoroughly extinguish all smoking and campfire materials before leaving.

Vehicle Use

- Don't park your vehicle over dry grasses.
- Make sure all off-road vehicles have working spark arrestors.

Other

- Teach children not to play with matches or lighters, and other rules of fire safety.
- Remember, fireworks are illegal on federal lands.

"Drown, Stir, and Feel"
to fully extinguish all campfires

Federal and State Forest Service Agencies Work Together

Colorado Legislation Promotes Good Neighbors

By Gail Binkly

Colorado has become the first state in the nation to implement a program that may help streamline the process of doing fuels-reduction work on National Forest System land adjoining private land.

Federal legislation passed in 2001 allowed the creation of "Good Neighbor Agreements" that involve the Colorado State Forest Service in fuels-reduction efforts on small tracts of federal land. Two such projects are planned in La Plata County, according to Dan Ochocki, Durango District forester with the Colorado State Forest Service.

"This is unique to Colorado," he said. "It's pretty cool. It's a real step forward in terms of interagency cooperation."

The legislation provides a framework for the U.S. Forest Service — not the Bureau of Land Management or any other federal agency — to enter into an agreement with CSFS regarding efforts to make property fire-safe.

Under the Good Neighbor Agreement, if the CSFS is reducing hazardous fuels on private lands, it can do similar work on adjoining NFS lands at the same time. The USFS pays the CSFS for its work on federal land and private landowners pay for the work done on their land.

"This allows the state to act as an agent for the USFS where you have a boundary [between federal and private land]," Ochocki said.

The fuels-reduction efforts include any work necessary, whether harvesting timber, clearing brush, or conducting prescribed burns.

Ron Klatt, fire management officer for the Columbine Public Lands Office, said the Good Neighbor Agreements should save money and offer greater efficiency in getting necessary work done.

Under a Good Neighbor Agreement, the CSFS lays out the project, marks the trees to be thinned, writes the contract, solicits bidders, and awards and administers the contract.

These are small-scale projects. The first such project to be implemented locally involved 118 acres at the Deer Valley Estates subdivision, according to Ochocki.

The subdivision, which is surrounded by NFS land, had done extensive thinning work. "Now we're doing work around the boundary to complement the work they've done," said Klatt.

Fuels-reduction work under another Good Neighbor Agreement was planned on about 60 acres at Falls Creek Ranch north of Durango, but was put off when the Valley Fire burned through part of that area. Klatt hopes that work will be finished this summer.

No such projects have been planned yet for Montezuma County, partly because there are fewer places where private land adjoins NFS land; the private-federal interfaces usually involve the BLM. There are also currently no projects planned in Archuleta County.

"I wish we had the same kind of agreement for BLM lands, but we don't," Klatt said.

Ochocki said the fact that Good Neighbor Agreements can be implemented here indicates the high level of local interagency cooperation.

"What precedes all this is an acknowledged level of trust and respect and a history of interagency cooperation where we know what to expect from each other," Ochocki said.


Untreated Forest Service land


Treated Forest Service land


Treated private land

Fire & Fuels in Southwest Colorado, summer 2003, is made possible through a partnership of the San Juan Public Lands Center, Colorado State Forest Service, and Office of Community Services at Fort Lewis College.

Editor: Pam Wilson
Layout and Design: Pam Wilson
Copy Editor: Gail Binkly, Tom Harris
Writers: Pam Wilson, Laurie Robison, Ann Bond, Gail Binkly, Dan Ochocki
Photography: Bob Winslow, Chris Figenshaw, Pam Wilson, Craig Goodell, Sheri Ascherfeld, Allen Farnsworth

The Public Lands Center and Public Lands Offices are jointly managed offices of the San Juan National Forest and BLM - San Juan Resource Area under the Service First Initiative. The offices offer joint permits for fuelwood and Christmas trees, maps for lands managed by each agency, and informational brochures. Stop by any of our offices to learn more.

San Juan Public Lands Center
15 Burnett Court
Durango, CO 81301
970-247-4874

Columbine Public Lands Office
367 S. Pearl St
Bayfield, CO 81122
970-884-2512

Dolores Public Lands Office
100 N. 6th St.
Dolores, CO 81323
970-882-7296

Pagosa Public Lands Office
180 Pagosa St.
Pagosa Springs, CO 81147
970-264-2268

Colorado State Forest Service
P.O. Box 7233
Durango, CO 81301
970-247-5250

Office of Community Services
1000 Rim Drive
Durango, CO 81301
970-247-7333

San Juan Mountains Association
15 Burnett Court
P.O. Box 2261
Durango, CO 81302
970-385-1210

Want to Know More?

Web Sites Offer Help

www.southwestcoloradofires.org
Local information on on-going fires, mitigation contractors, Community Fire Plans and more

www.fireplan.gov
National Fire Plan

www.firewise.org
National FireWise site -- defensible space tips

www.nifc.gov
National Interagency Fire Center

www.fs.fed.us/r2/sanjuan
San Juan National Forest

www.fs.fed.us
U.S. Forest Service National Site

www.co.blm.gov/sjra/index.html
San Juan Resource Area - BLM

www.blm.gov
BLM National Site

www.sanjuanmountainsassociation.org
San Juan Mountains Association

ocs.fortlewis.edu/Stewardship/index.htm
Community and Ecosystem Stewardship

www.wildfirenews.org
Wildfire News