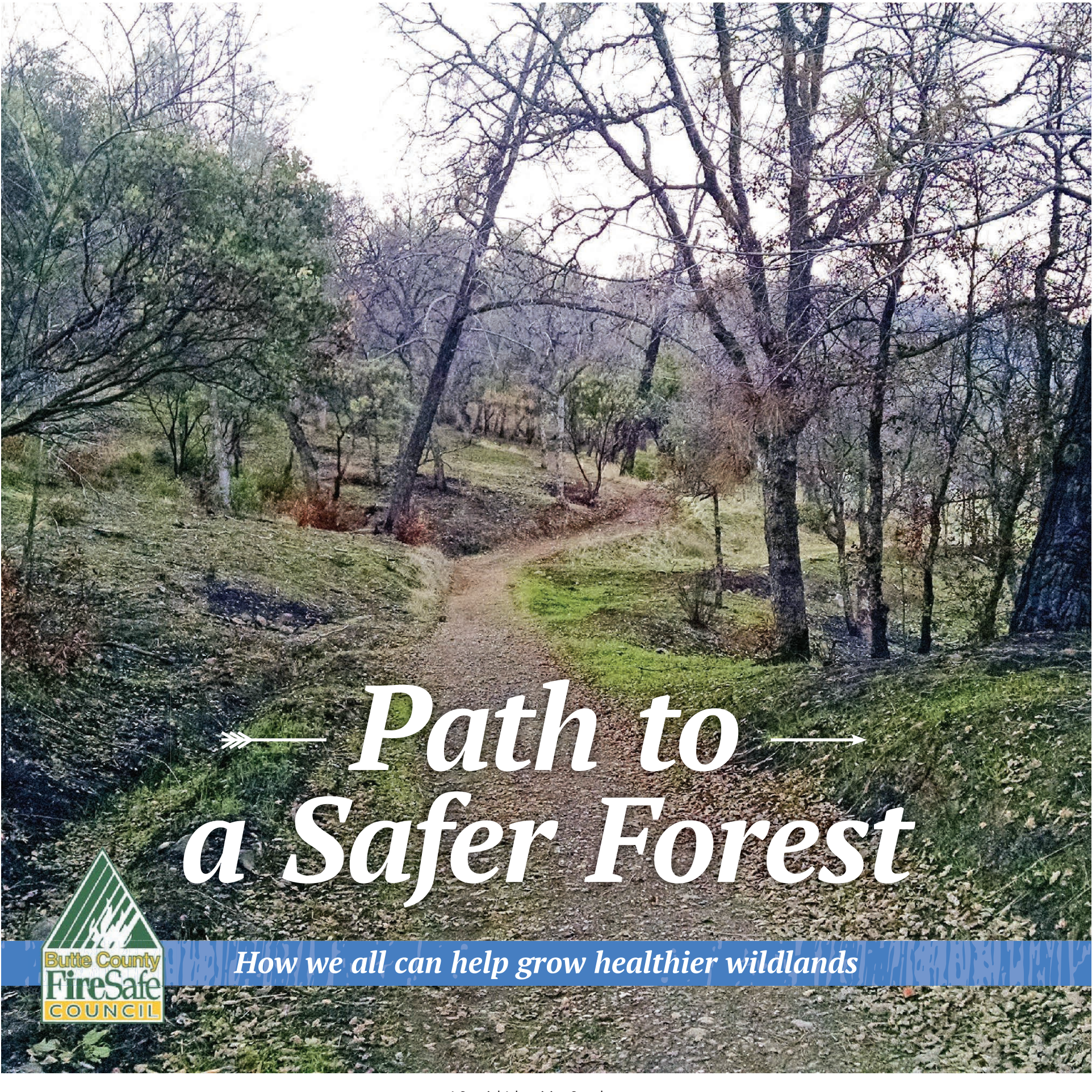




Path to a Safer Forest



How we all can help grow healthier wildlands



Calli-Jane DeAnda, executive director of the Butte County Fire Safe Council, has seen California forests become dangerously overgrown.

PHOTO BY MICHELLE CAMY

WHO IS THE FIRE SAFE COUNCIL?

Helping to create a first line of defense, the Butte County Fire Safe Council, a non-profit, grassroots organization, provides wildland fire mitigation and recovery services to local communities within Butte County.

Recognizing the potential wildfire dangers inherent in living close to nature, the organization strives to make the county a safer place through wildfire hazard education, mitigation and wildfire recovery.

The council collaborates with community partners, volunteers and staff to educate the public about wildfire prevention and what each of us can do to cut down on wildfire's devastating impact.

The council has been particularly involved in aiding Butte County's recovery from the 2018 Camp Fire, the worst wildfire in California history. To prevent future fires, the council helps landowners remove dead and dying trees at cost.

► Find out more at www.buttefiresafe.net.

Californians love their forests. More than 33 million acres of forest and woodlands grow in our state. Preservation of those trees and natural areas has been a priority for decades. But most Californians have never seen a healthy forest in their lifetimes. Our forests are dangerously overgrown and prone to devastating wildfires.

Wildfire is a complex problem. We need solutions on several levels to become adapted to living with fire. As individuals, we need fire-resistant buildings, defensible space, evacuation routes and shelters. Together, we need to focus on restoring forest health and eliminating some of that risk.

"The more overgrown the forest, the more dangerous," said Calli-Jane DeAnda, executive director of the Butte County Fire Safe Council. "Driving through our different forested communities, I feel a bit of anxiety at how overgrown they are. Will we have forests in 50 years? Will our grandchildren have a forest or burned mountain sides?"

A Butte County native, DeAnda grew up on Pentz Road. Her youth shaped her view of the forest and desire to protect it.

"Definitely," she said, "partly because as a child I grew up in the mountains and got to see all the things it took for mountain living – cutting your own firewood, trimming brush. I understood the connection between people and the land. It's a two-way street. If the land suffers, people are going to suffer.

"The forest is our garden," she added. "We need it for our water. We need it for our air. It's important to maintain its health."

Restoring Forests to Health and Safety

Overgrown conditions create danger for people, wildlife and trees, but there are solutions

By Debbie Arrington

As California's population increases, more and more people live in or near the wildland-urban interface, the area where woodlands and development meets. That adds to the danger – to people, wildlife and trees.

In addition, fires are part of the natural life cycle of California's native forests and wildlands. Constant suppression has consequences. As we've seen, the result can be disastrous. Overgrowth and forest mismanagement were contributing factors in recent major blazes that torched the state.

"The situation is even more dire today."

Calli-Jane DeAnda
Executive director, Butte County
Fire Safe Council

"The situation is even more dire today," DeAnda said.

This month is the one-year anniversary of the Camp Fire, the worst and deadliest wildfire in California history. Blackening a broad swath of Butte County, that single wildfire destroyed nearly 19,000 buildings (including most of the town of Paradise), killed 86 people and burned 153,336 acres. Nobody wants to see another Camp Fire. But how do you prevent a repeat?

There is a need for consistent, long-term forest management. There are a number of

advanced woody-biomass utilization options. For example, cross-laminated timber, pseudo-plastics and biomass-to-energy represent opportunities to utilize otherwise disposed of materials. That being said, there's currently a lack of local infrastructure capable of facilitating the need for regional processing and marketing; we need to work together to enable that capacity.

"Going forward, we know that's what we will need to do," DeAnda said.

The Butte County Fire Safe Council saw firsthand how that plan can work. A five-year forest restoration project near Paradise Lake is credited with protecting the Town of Paradise's drinking water supply. A portion of the project was on U.S. Forest Service lands where trees had been thinned and then survived the Camp Fire that blazed through.

"It burned with a lower intensity," DeAnda explained. "The trees survived. It didn't have the devastating impact it could have had. It helped slow the fire down."

Such restoration projects are collaborations between fire safe councils and their communities.

"We really want people to get involved with their fire safe council," DeAnda said. "There's one in every foothill community. It's all grassroots and a great vehicle for people to get involved. We can make a difference."

Local fire safe council's include: Forbestown Ridge, Feather Falls, Berry Creek, Yankee Hill/Concow, Paradise Ridge, Forest Ranch, Lake Wyandotte Oroville Foothills and Cohasset.

Is There a Cure for California's Unhealthy Forests?

Overcrowding leads to tree mortality, fire danger and risks to communities

By Allen Pierleoni

Over the decades, a perfect storm has gathered to make large swaths of California's 33 million acres of woodlands unhealthy and, thus, extremely susceptible to fires.

Drier summers, wetter winters, insect infestation, disease, unchecked fuel loads, tree crowding, and shrub and grass overgrowth have altered and endangered our forests and the communities that border them.

Some startling numbers come from the Sierra Nevada Conservancy, which estimates there are 129 million dead trees throughout the state, 85 percent of them in the Sierra Nevada.

"The primary reason for unhealthy forests is that land use has changed," said CAL FIRE's Dave Derby, the agency's Butte County Unit forester and environmental coordinator.

One major issue is that 13.3 million acres of forested land are under private ownership and "there's tremendous pressure to turn it into

residential areas," he said. "[As such], it's not practical to manage the timber on them, they're too small. But the more property that gets cut up into pieces, the bigger the challenges of

"We now have forests that John Muir wouldn't recognize."

Hugh Safford
Regional ecologist for the
U.S. Forest Service

dealing with a forested landscape. The trees keep growing and the overcrowding problem increases. Nature hates bare ground."



Forest that had been thinned survives 2018 Camp Fire at Paradise Lake, Magalia, Calif.
PHOTO COURTESY OF BUTTE COUNTY FSC

Nature also hates disruption, said Hugh Safford, a regional ecologist for the U.S. Forest Service and researcher in the UC Davis Department of Environmental Sciences.

"The major ecological process that existed for millennia and does not exist much anymore is fire," he said. "It was typical for an average stand to experience low-level ground-type fire every 10 to 20 years, either by lightning strikes or by being set by indigenous people."

When Euro-Americans arrived in California, "they thought, 'Fire is bad, we want to stop it.' Then, after 100 years, you had a whole lot of fuel on the ground."

Today, a shocking amount of forest acreage is "dense, dark jungles of fuel," Safford said. "Instead of having plenty of groundwater and open space, we now have forests that John Muir wouldn't recognize."

As CAL FIRE's Derby sees it, one solution is to promote and manufacture more wood

products grown in California instead of sourcing them from foreign countries. "We have trees right here," he said. One byproduct would be increased forest management.

"There has been real progress in aggressive forest management, but we have to reduce tree density, using every method possible while being environmentally sensitive," Safford said. "People who don't want any trees cut for any reason just don't get the extent of the problem."

Anyone with a tree-dominated landscape should reach out to specialists for guidance on forest health, Derby advised. The goal would be to return the woodland to a more sustainable and safer condition.

Funds are available to help subsidize those projects through CAL FIRE and the federal Natural Resources Conservation Service, he said. In Butte County, the Resource Conservation District is coordinating post-fire forestry projects.

EXTREME COST OF DOING NOTHING

Neglecting our forests comes at our own peril. From the first spark, the cumulative costs of firefighting are exorbitant. For instance, the California Department of Forestry and Fire Protection (CAL FIRE) spent \$635,815,975 on fire suppression in the fiscal year 2018-2019, says CAL FIRE spokesman Scott McLean. Add the expenses incurred by other firefighting agencies,

plus the astronomical cost of property loss and damage, and it's clear that neglecting our forests comes with dire consequences.

Consider this sampling of direct costs of major California wildfires, compiled by the National Interagency Fire Center. The actual cost may be three times higher, including fire suppression, loss of structures, alternate

accommodations during evacuation and rebuilding, loss of jobs and economic productivity, medical costs associated with injuries and PTSD, and loss of natural benefits. The actual economic impact of the Rim Fire, for example, is estimated as high as \$388 million. Including those indirect costs, the economic impact of the Camp Fire could top \$50 billion.

2018 Camp Fire in Butte County:

\$16.5 bil.

estimated in property loss, burned 153,336 acres, destroyed 19,000 structures (including homes), cost 86 lives. The global insurance group Munich RE classified it as the "world's costliest natural disaster" for that year.

2016 Soberanes Fire:

\$260 mil.

132,000 acres, 68 structures, one life.

2015 Rough Fire:

\$121 mil.

151,623 acres, four structures, one injury.

2014 King Fire:

\$102.5 mil.

97,000 acres, 80 structures.

2013 Rim Fire:

\$127 mil.

256,000 acres, 112 structures, 10 injuries.

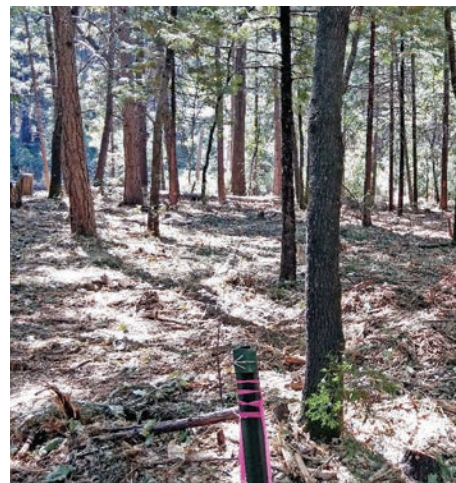
HOW TO MAKE FORESTS SAFER

There is no such thing as a forest that's safe from fire, says Don Hankins, a CSU Chico professor of environmental geography.

"The question is how to create a landscape that fire can be a part of, yet not have a devastating impact."

To that end, there are proven forestry-management techniques that can help keep forests safer from destruction, and benefit them in other ways.

- **"Prescribed" or controlled burns** target specific areas in order to remove invasive vegetation, restore landscapes and woodlands, and clear away combustible fuel sources that litter the forest floor, such as dead tree limbs. Controlled burns expand habitat for wildlife, serve as pest and disease control, and reduce the chance of wildfires.
- **Thinning** is the removal of smaller trees to give more space to larger trees in an overcrowded forest. It promotes new growth and tree health, makes it more difficult for fires to spread, and creates new wildlife habitat.
- **The mechanical removal of fuel loads** – dead trees and vegetative detritus, thickets and underbrush – requires work with chainsaws, mastication machines and chippers. The mastication machines and chippers shred overgrown vegetation, leaving it as mulch on the forest floor. The less the fuel load, the slower and less intense a fire will burn.



Pine Ridge School Forest in Magalia shows the difference treatment makes. At left is the overgrown forest; center, the healthy forest after thinning completed. CSU Chico professor Don Hankins, right, is a prescribed fire practitioner.

PHOTOS COURTESY BUTTE COUNTY FIRE SAFE COUNCIL AND DON HANKINS

How Fire-Safe is a Forest? Here's How to Tell

The right management techniques can save the woods and the town

By Allen Pierleoni

With some 33 million acres of California covered in forests, one undeniable and urgent fact of nature is this: Forests and fire are inseparable.

"Fire is going to be the main driver of a forested landscape," said Don Hankins, an environmental geographer with CSU Chico. He's also a "pyrogeographer," meaning "I set fires in forests, grasslands and wetlands and study them." That's accompanied by community members or observers from governmental agencies, of course.

Another fact of nature is that a forest fire will be less severe if steps are taken to make the woodland safer. So, what constitutes a "safe" forest?

"A safe forest and a healthy forest go hand in hand," Hankins said. "A forest with a diversity of plants and wildlife, meadows and a mixed-age class of trees and vegetation is going to be healthier than a forest with trees of the same age."

"If we're thinking about a safe forest in terms of the wildland-urban interface, the landscape has been thinned and managed in a way that changes the structure of the vegetation," he said. Which for one thing means there's less fuel load – the combustible detritus that litters forest floors – to feed the flames and increase the heat.

So when a fire occurs in a "safe" forest, "it's not killing the forest or spreading into a community," Hankins said.

Hankins is a proponent of prescribed burns as a forest-management technique for safer forests "because they have the best ecological outcome and are cost-effective."

Deliberately burning certain sections of woodland is an ancient practice. "California's landscapes evolved with 'cultural burns,' in the

In addition, prescribed fire removes fuels from the forest, while many other treatments just leave the material on the forest floor.

But a shift took place over the past century, Hankins pointed out. "The practice of planting trees and maintaining denser forests – coupled with climate change – created some of the fire problems we're seeing today. The system cannot be self-sustaining. You lose safety in that formula."

More than 13 million acres of forested land in California is privately owned, which has been a longstanding issue: Who is responsible for managing it and making it as safe as possible, and what are the standards?

Hankins sees "the biggest opportunity" is for private landowners to work "across boundaries" with federal and state agencies to achieve the same forest-management plan.

"It would become a much more resilient ecosystem with that process in play," he said.

"A safe forest and a healthy forest go hand in hand."

Don Hankins
Environmental geographer

sense of indigenous people using fire as a tool to clear the landscape and return the forest to a healthier state," he said. Consequently, over time, the landscape became more resilient to fire.

► **HERE'S HELP:** The U.S. Forest Service offers multiple resources to help private landowners keep their forests safe.

Visit <https://www.fs.fed.us/managing-land/private-land/landowner-resources>

Fighting Fire with Fire and Goats

Prescribed burns, grazing help restore forest health

By Howard Hardee

Over the past century, forests in the Sierra Nevada have grown unnaturally dense as people have suppressed wildfires in California. Combined with widespread tree mortality related to drought, bark beetles and a rapidly changing climate, conditions are primed for catastrophic wildfires.

And the forest isn't going to fix itself. A wide breadth of state agencies, nonprofit groups, private companies and family forest landowners agree: Reducing fuels cuts down on density, promotes forest health and mitigates the risk of major disasters such as the Carr, Camp and Tubbs fires.

"If our forests are tended and well managed, the fires that come through in the future won't have the same devastating impact," said Susan Cueva, a member of the Forbestown Ridge Fire Safe Council in Butte County.

"I'm a firm believer in prescribed fire because I think fuel reduction is our biggest problem."

Susan Cueva
Fifth-generation forest landowner

A fifth-generation forest landowner, Cueva has watched over several decades as the forest on her family's property has become more overgrown with brush. She said the property was treated with prescribed fire from the 1850s to the 1960s, until state regulations made it too difficult for landowners to perform controlled burns, the only forest treatment that actually eliminates substantial fuel without the need to remove woody debris and transport elsewhere.



Goats graze on Susan Cueva's land to help maintain brush regrowth after forest thinning.
PHOTO COURTESY OF SUSAN CUEVA

But it looks like the old ways are returning. In the wake of the Camp Fire, the state is beginning to support small-scale burn operations performed by residents with a number of training programs and grants. It's been a long time coming for private landowners like Cueva.

"I'm a firm believer in prescribed fire," she said, "because I think fuel reduction is our biggest problem."

Cueva helps secure state and federal grants that allow the Fire Safe Council to create fire breaks along roadways and reduce forest fuels through mechanical mastication, and her family thins underbrush and burns piles of woody refuse on their own property.

"The work is constant, but well worth it," she said.

Cueva is involved with a branch of the Butte County Fire Safe Council, a nonprofit grassroots organization that encourages responsible stewardship of local forestlands, especially in fire-prone places where people

live. The council promotes both human safety and forest health by emphasizing evacuation preparedness and maintaining "defensible space" – clearing areas around homes of flammable plants and materials.

Calli-Jane DeAnda, the group's longtime executive director, says the Fire Safe Council supports stepping up controlled burns in Butte County for a host of safety and health reasons.

"We need more prescribed fire and less catastrophic wildfire smoke," she said.

Proactively burning the forest wasn't such an easy sell five years ago, DeAnda said, but most residents now understand the need to reduce forest density in the wildland-urban interface. She encourages those same residents to be part of the solution by getting involved with one of several satellite Fire Safe Councils in Butte County's foothill communities.

"It's about community involvement and this culture of folks who are prepared for living in a wildfire environment and have a passion for helping each other," she said.

DANGERS OF WILDFIRE SMOKE

In addition to the immediate threat to lives and property presented by catastrophic wildfires, there are health risks associated with breathing in wildfire smoke – especially for young, old and sick people.

Wildfires produce fine particulate matter, or tiny particles that reduce visibility and cause the air to appear hazy. Some of these particles are microscopic, small enough to infiltrate your lungs and even your bloodstream. According to the U.S. Environmental Protection Agency, exposure to fine particulates can affect both your lungs and heart, and has been linked to:

- Premature death in people with heart or lung disease.
- Nonfatal heart attacks.
- Irregular heartbeat.
- Aggravated asthma.
- Decreased lung function.
- Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

Wildfire smoke contains many dangerous toxins from burned structures, vehicles and other things consumed by flames, making that smoke especially unhealthy.

While prescribed burns produce wood smoke, that smoke is present for a much shorter period and less toxin-filled than wildfire smoke. Limiting exposure to smoke from a prescribed burn can be planned for in advance.

That's why the efforts of agencies such as CAL FIRE, Butte County Air Quality Management District and the Butte County Fire Safe Council to reduce forest density and mitigate the risk of another major wildfire like the Camp Fire is also smoke-reduction treatment, helping to keep our air cleaner.

Finding Common Ground

Stakeholders come together to tackle forest restoration

By Howard Hardee



Stakeholders have banded together to restore Sierra Nevada forests to good health.

PHOTO COURTESY OF BUTTE COUNTY FIRE SAFE COUNCIL

We have loved our forests to death. Forest management has long been a contentious issue in California.

For decades, it was nearly impossible to get stakeholders to agree on any individual issue associated with natural areas, wildfire and timber harvest.

But recently, forest experts, rural residents and elected officials alike are finding common ground in this era of extreme wildfire. When it comes to keeping the forests healthy and safe for people, stakeholders generally recognize

capacity to do prescribed fire,” she said. “It’s something anybody can do with the right training and resources.”

Under Senate Bill 1260, California is rolling out a prescribed fire curriculum that will allow private residents to become certified burners. The RCD is also helping organize a prescribed burn association, a cooperative of landowners that helps each other burn when the timing is right. And while fuel reduction projects are expensive, state and federal grants are helping cover the costs.

This is all a welcome change to Frank Stewart, who serves on the California Fire Safe Council board of directors. For the first time in his 50 years of working as a forester in the state of California, Stewart is seeing state and federal officials pushing in unison for large-scale fuel reduction and forest restoration projects.

“Paradise is what woke everybody up,” he said.

Stewart believes the most important priority is controlling vegetation in the forests and avoiding overstocked stands. In an ideal wildland-urban interface, there would be plenty of space between the crowns of trees and bushes on the ground. There would be different outcomes for the forests. If forests are treated, then fewer trees would die.

“That’s exactly why the Camp Fire was so devastating; it had so much fuel,” Stewart said. “It was a wall of embers and flames because there was so much vegetation.”

And people who live in these areas also should be more adapted to living with fire.

Dave Brillenz, District Ranger for the Plumas National Forest, says proactive forest management takes buy-in from a host of agencies and landowners.

“I think the Fire Safe Council does a great job of bringing in as many of those partners as possible,” he said. “They are always looking for new groups to form around the issues that are relevant to the community, and they’re open to different ways of approaching being fire safe.”

Stewart agrees: Protecting the forests and foothill communities in Butte County and beyond from catastrophic wildfire is bringing people together.

“That’s the beauty of what these Fire Safe Councils are doing,” Stewart said. “We have over 200 councils across the state, and they all bring together people so they can plan out and get the work done.”

► To learn more about the prescribed burn association, visit the RCD’s website: www.bcrd.org.

“Paradise is what woke everybody up.”

Frank Stewart
Forester

that the woodland fuel load in the Sierra Nevada is immense and needs to be reduced through thinning and prescribed burning.

“I can’t remember another issue where there’s been so much consensus in theory,” said Wolfy Rogle, project coordinator for the county’s Resource Conservation District (RCD). She believes that the only sustainable and cost-effective way to maintain the forests is through prescribed burning, but not enough people know how to do it.

“We need to build the community’s

WATERSHED DATA PORTAL



The Sacramento River Watershed Program (SRWP) and Butte County Fire Safe Council have partnered with 34 North, a data and software development company, to develop a collaborative planning process and a “Fuels Reduction and Forest Restoration Planning Tool” (<https://buttecounty.opennrm.org/>) to strategically implement fire prevention efforts and provide data, information and tools to build capacity, leverage resources, and secure funding to

reduce wildfire risk and restore forest health in Butte County’s forested watersheds.

SRWP Executive Director Holly Jorgensen explains that “connecting data and information to community identified concerns will inform and improve responses to forest health issues in our communities.”

► Check out the SRWP’s new data portal at www.sacriver.org and follow the links.

PUT YOUR HOME ON DEFENSE

‘Harden’ your home and think of the space around it as zones. Follow these guidelines provided by Firewise USA.

Home Hardening

Embers and flames are the main way most homes ignite during wildfire. By hardening your home and surrounding landscape, your home is more likely to survive.

Think of everything in terms of fuel for a fire, says Dr. Kate Wilkin, UC Cooperative Extension Forest and Fire Advisor. Design your home, other structures and landscaping to be fire resistant, using fire-resistant materials. Then, regularly maintain your defensible space. Remember: Maintenance is the unsung hero of fire preparedness.

ZONE 1: From 0 to 5 feet

Design: No plants or combustible materials near homes or decks.

Materials: Bare mineral soil, gravel or concrete.

Maintenance: Keep this area clear of leaves, trash cans, etc.

ZONE 2: From 5 to 30 feet

Design: Create a separation between trees, shrubs and other “fuel” items that could catch fire, such as mulch, patio furniture, wood piles, swing sets, trash cans, etc. Extend this zone along escape routes.

Materials: Use nonflammable items, like rock patios or paths, to break up fuel continuity. No firewood piles.

Maintenance: Remove dead and dying plant parts from all grass, weeds, shrubs and trees.

Remove dead or dry leaves and pine needles from your yard, roof and rain gutters.

Trim trees regularly to keep branches a minimum of 10 feet from other trees.

Remove branches that hang over your roof and keep dead branches 10 feet away from your chimney.

Remove or prune flammable plants and shrubs near windows and vents.

Keep grass mowed under 4 inches in height.

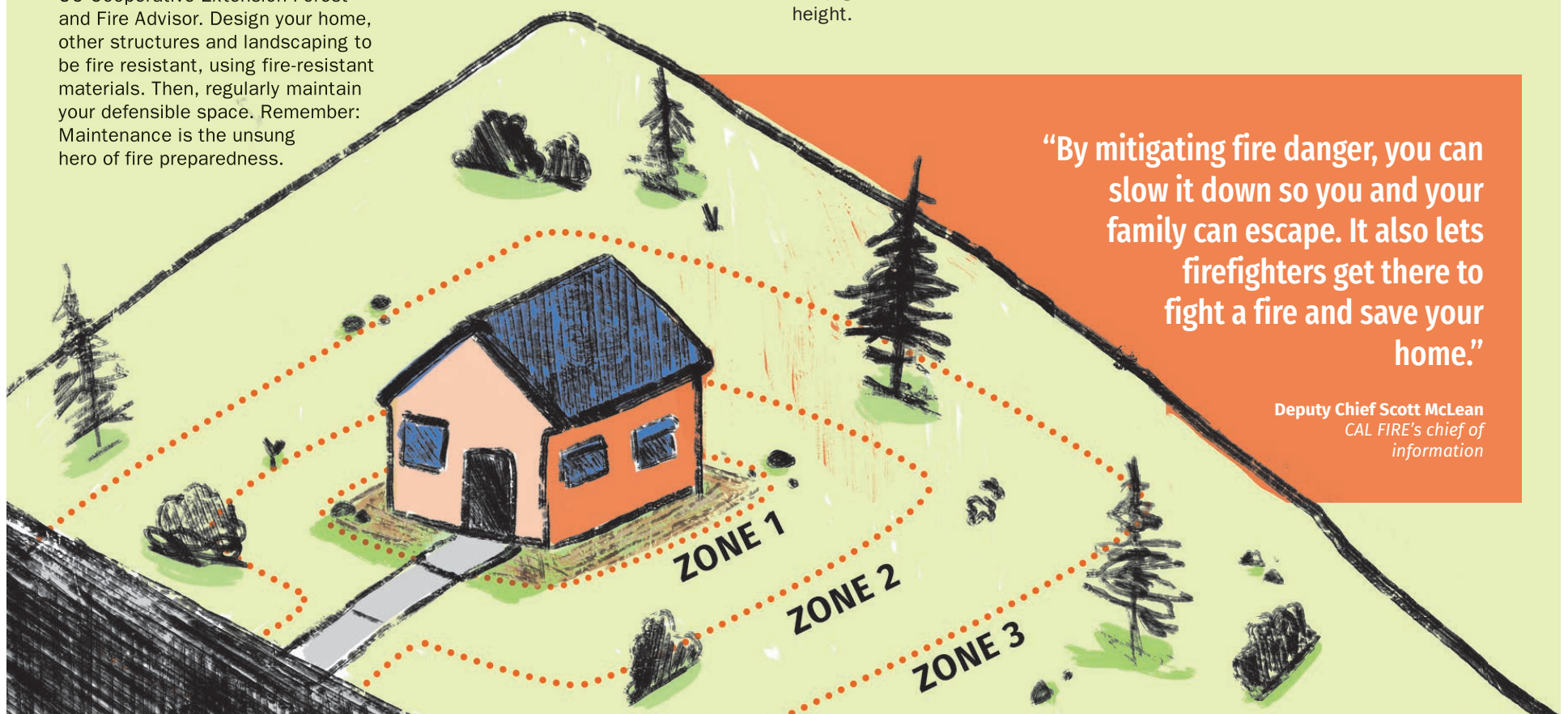
ZONE 3: From 30 to 100 feet

Design: Create horizontal spacing between shrubs and trees. Space trees at least 10 feet apart from branch tip to branch tip.

Create vertical spacing between grass, shrubs and trees. A mature tree should have at least 6 feet clearance under its lowest branch.

Maintenance: Cut or mow annual grass down to a maximum height of 4 inches.

Remove fallen leaves, needles, twigs, bark, cones and small branches. However, they may be permitted to a depth of 3 inches.



For more tips, go to Firewise USA's home preparation page, <https://bit.ly/33rY495>.

TAKE THIS FOREST HEALTH QUIZ

How much do you know about keeping our wildlands safe?

Circle all answers that apply.

1. Which of the following practices can improve forest health?

- a) Prescribed fire
- b) Thinning crowded forests
- c) Mechanical treatments such as mastication
- d) Grazing

2. Which of the following natural communities are common in the Sierra Nevada?

- a) Oak woodlands
- b) Mixed conifer forests
- c) Shrublands
- d) Meadows

3. What are some solutions to wildfire problems?

- a) Active forest management
- b) Thinning overgrown forests
- c) Retrofitting existing homes to be ember- and flame-resistant
- d) Maintaining fire-wise gardens and landscaping
- e) Fire-adapted land use planning

4. How many trees per acre were in our historic mixed conifer forests?

- a) 50-150 (open forest, easy to walk through)
- b) 200-400 (crowded forest, not easy to walk through)

5. How many trees per acre are in our current mixed conifer forests?

- a) 100-200 (mostly crowded forest)
- b) 400-900 (dense forest that you can't walk through)

6. What are aspects of a fire-adapted community?

- a) Fire- and flame-resistant structures
- b) Defensible space
- c) Firewise USA certification for neighborhoods
- d) Evacuation route clearance
- e) Fire Safe Councils and collaborators
- f) Fire preparedness policies
- g) Fuel breaks

7. What are some ways that overgrown forests resources can be utilized?

- a) Small trees and limbs can be burned in a "top down" method to make Biochar
- b) Wood chips can be burned for electricity (cogeneration)
- c) Firewood
- d) Small wood products such as fence boards and wine boxes
- e) Wood pellets can be used to heat homes
- f) Vegetation and limbs can be turned into compost

Answers: 1 – all, 2- all, 3-all, 4-a, 5-b, 6-all, 7-all



Funding for this project provided by the California Department of Forestry and Fire Protection as part of the California Climate Investments Program.

Help Your Community Be Fire Safe



Butte County Fire Safe Council
5619 Black Olive Drive
Paradise, CA 95969
530-877-0984

Learn more at:
www.buttefiresafe.net

AMONG THE PROGRAMS THE FIRE SAFE COUNCIL OFFERS:

- Turn fallen branches and brush into mulch with the chipper program.
- Borrow a weed wrench to remove established weeds.
- Learn your community's evacuation plan in case of wildfire.
- Find out how to get rid of broom and other invasive species.
- It's easy to support your grassroots Fire Safe Council, join our "Friends of Butte County Fire Safe Council" membership.
Go to: <http://buttefiresafe.net/membership>

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