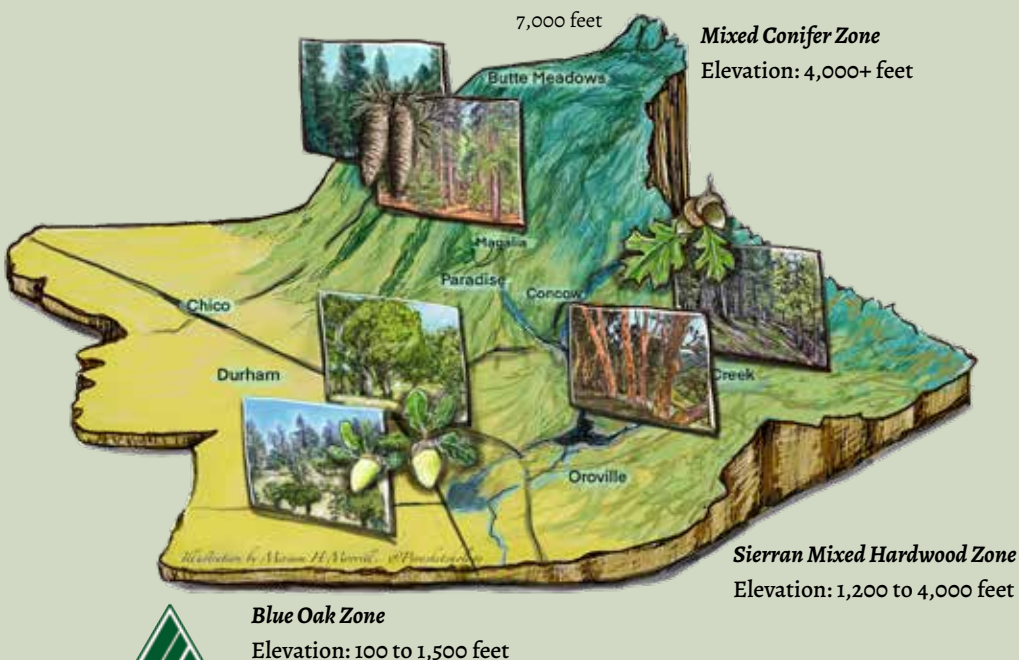


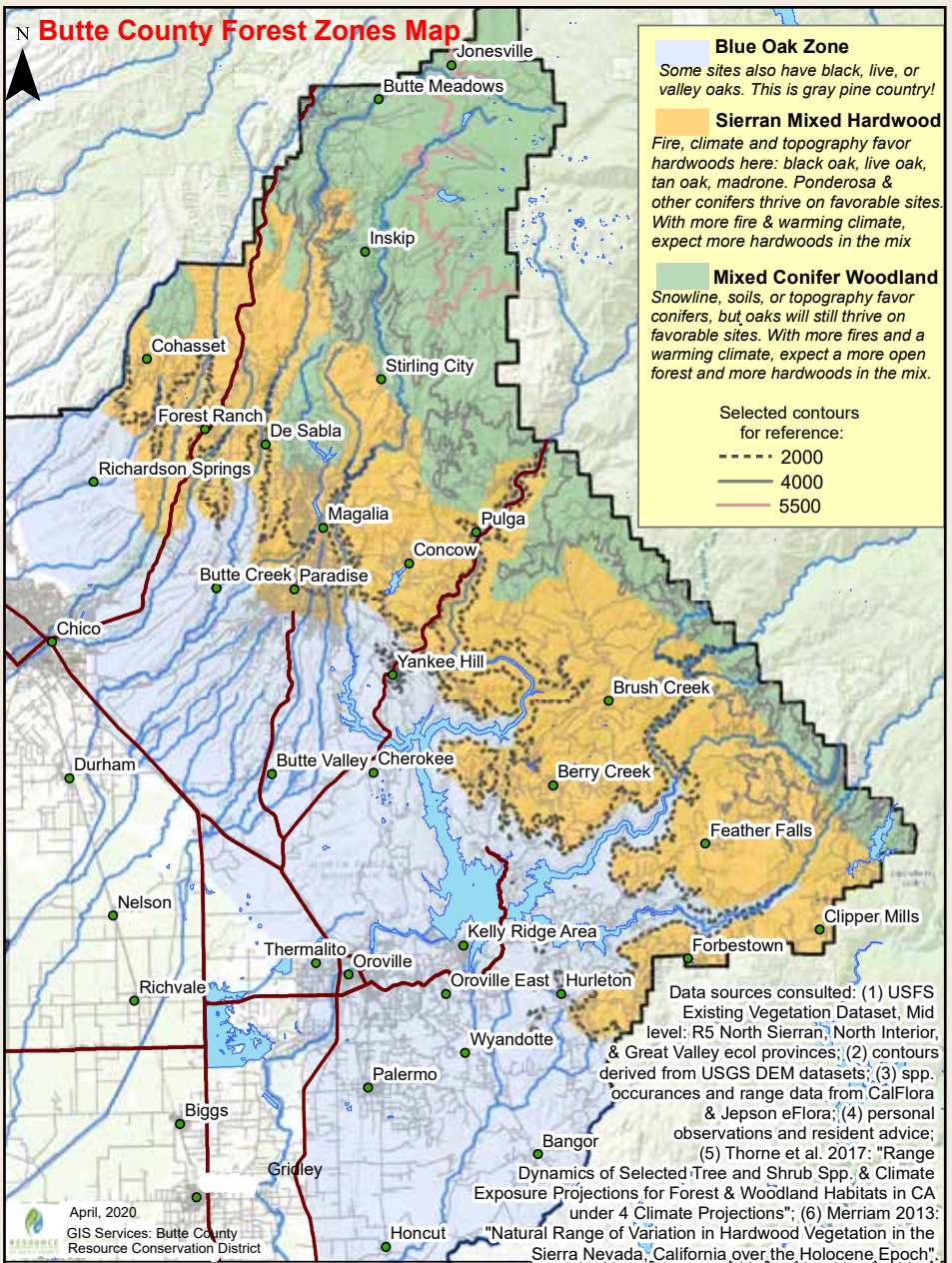
Butte County Forest Health



GUIDEBOOK



A Practical Guide for Property Owners



WHO IS THIS GUIDEBOOK FOR? This book is for Butte County Wildland-Urban Interface (WUI) property owners. The WUI is the zone of transition between wilderness and land developed by human activity. Butte County’s WUI is made up of more than 200,000 acres of forested land. These acres consist of privately-owned parcels ranging in size between .25 and 100+ acres. This guidebook will help owners of small parcels understand how to manage, restore, and maintain their land.

Why this guidebook?

In the past 20 years, high severity wildfire has devastated Butte County, burning more than 400,000 acres and destroying 20,000 structures. Our forests and communities need attention to prevent further destruction.

Living in the forest is a gift to enjoy—and a responsibility to protect for the future. This guide will help you, as a landowner, understand how to care for your land to prevent the negative impacts of high severity wildfire. This guidebook is delineated by three basic forest types as identified below.

Steps to take to create a healthy forest:

1. Identify Your Zone (see Butte County Forest Zones Map, left)

Mixed Conifer Woodland Usually above 3500 ft

Sierran Mixed Hardwood From blue oaks up to 3500-4000 ft

Blue Oak Valley floor to about 1500 ft

Zone boundaries aren't fixed: they shift with aspect, special features like creeks, and with shifting climate trends. So if you're near a boundary between zones, look uphill and downhill to see the kind of woodland your grandkids will inherit!

2. Explore Your Forest 2-3 11-12 20-21
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Blue Oak

Blue oaks may be the most heat and drought-tolerant oaks anywhere. They only live in California's Central Valley, where their acorns, leaves and cavities support a cast of insects, lichens, fungi, birds, and mammals.



Steve Schoonover

Blue oaks are quite fire-tolerant and enjoy regular, low-intensity fire. It helps them produce more acorns. Blue oaks grow very slowly and all ages of blue oaks need protection: little, pole-sized adolescents, mature trees in their acorn-bearing prime, and legacy elders (full of nesting cavities for countless wildlife) all have a role in a healthy forest.

Rainfall:

12 to 36 inches/year

Most studies of blue oak woodlands agree they like to burn every 5-10 years.

Elevation:

100 to 1300 ft

Fire return interval:

5 to 10 years

A healthy blue oak woodland:



Butte Valley

Calli-Jane DeAnda



Lime Saddle

Signs of a healthy woodland include:

- Charcoal on the ground under mature trees. This means good fire has been here!
- Small groupings of native shrubs (see below)
- Minimal shrubs right under large oaks
- Dead trees (“snags”) – at least two to four per acre!
- Gray pines – very important food source for wildlife
- A diversity of ages of trees and shrubs
- Lots of air and sunlight – you should be seeing a long way!
- Blue oaks’ canopies shouldn’t be touching other trees, at least not on all sides. Give them space. But, a varying mosaic (some denser areas with some openings) is better than a regular spacing across your entire property.

DID YOU KNOW?

Have you ever wondered why you can walk through acres and acres of mature blue oak woodland but never see a baby blue oak? It’s because baby blue oaks growing in the open are very vulnerable to grazing, rodent-nibbling, and sunburn. They actually need clumps of “nurse shrubs” to protect them until they grow tall. Any native shrub can fill the role— manzanita, ceanothus, even poison oak. (Maybe that’s why some people prefer to call it “guardian oak”!) Bottom line: don’t plant blue oak acorns out in the open and expect them to do well!

Healthy to unhealthy range of variation in blue oak woodlands



Ali Meders-Knight

Blue oak woodlands that haven't burned for a long time are full of twisty manzanita branches, old fallen wood, and dark hiding places.



Left, see just how much brush can be hauled out of a small patch of overgrown woodland! This brush in Lime Saddle was burned during winter days to return nutrients to the soil.

Calli-Jane DeAnda



Ali Meders-Knight

Healthy blue oak woodlands feel spacious and light. You can see a long way, and in spring the flowers might be so thick you can't walk without stepping on them! If you dug into the grass, you might find charcoal. Some plants are still black from the last fire.

Right, this Butte Valley blue oak woodland was back-burned during the Camp Fire. It regrew new leaves the next spring and is healthy today.



Calli-Jane DeAnda

Is your blue oak woodland fire-resilient?



Care and feeding...

Blue oak woodlands should be thinned once the oaks are crowded together, when dead wood is accumulating in the canopy and on the ground, and when you can't see deer before you hear them. It's okay to have denser patches and more open patches – in fact this variation across a landscape is good. It's also okay when riparian areas are naturally thicker than ridgetops or flats.

Select the trees and clumps of shrubs you want to keep. Keep some from every age and species, but favor: The largest oaks and pines; The trees with the most cavities and unusual shapes; Clumps of shrubs that are slightly outside the dripline of legacy oaks (these will nurse the next oak generation). Most folks will like to select for shrubs that are less common on their property or for those that bloom when others don't. It's good for oaks to be in groups, but shoot for about 70 trees per acre. That translates to an average spacing of 25 feet.

- This is a big job and could take you years if you are working alone. Join your local Fire Safe Council for help!
- Remove invasives from the understory, such as Himalayan blackberry, scotch broom, black mustard, and star thistle before they go to seed.
- Scotch broom and black mustard should be pulled out by the root and left on top of slash piles to die. DO NOT “chop-and-drop” or “mulch” scotch broom. Blackberry can be cut into burn piles.
- Widening existing deer trails is an excellent thinning strategy for young blue oak woodlands (plus toyon/manzanita/ceanothus thickets).
- Once your woodland is fire-safe, maintain it with grazing, fire, or both. Join your Prescribed Burn Association for help.



Calli-Jane DeAnda

Above, blue oak that survived the Camp Fire.

My blue oak woodland burned—what now?

If a fire sweeps through your blue oak woodland, you probably don't need to do anything. Although it may look like everything has burned up, grasses and flowers will regrow in the spring. You may even see “fire follower” wildflowers you've never seen before!

And even if your blue oaks look dead, there's a very high chance they will resprout. Resprouts grow much faster than new oaks grown from acorns. Redbud, elder and most shrubs will resprout, too. Only gray pine will not resprout. *In most cases, you do not need to replant anything after a fire.*

If you have lots of standing blackened shrub stems, try to knock them to the ground so they can nourish the soil and help rainwater infiltrate. Pull invasive weeds, enjoy watching wildlife, and wait. The stark black beauty of a recently burned landscape will be gone soon, so enjoy it while it lasts!

What about valley oak woodlands?

Valley oak woodlands like to burn about as much as blue oak woodlands. If you explore under these big oaks at Big Chico Creek Ecological Reserve, you'll see charcoal mixed in with this year's leaf fall!



Wolfy Rougle



“Good fire” in blue oaks

Ali Meders-Knight

In open blue oak woodlands, skilled burners can use deer trails as firebreaks when the weather conditions are just right. Even the transition zone along the driplines of large oaks can serve as a firebreak under the right conditions.



1-HOUR FUELS are soaking wet after one hour of rain, but dry out after one hour of wind.



10-HOUR FUELS are finger-sized. They take 10 hours to get really wet or dry.



DID YOU KNOW? You can buy special “10-hour fuel sticks” that weigh 100 grams when bone dry. Set them outside and weigh them now and then to monitor fuel moisture on your forest floor (110 grams = 10% ten-hour fuel moisture—ideal for some burn units!).



100-HOUR FUELS are 1 to 3 inches thick, like axe handles. After a good rain, they can stay damp three to four days.



1,000-HOUR FUELS are thicker than your arm. They take weeks to dry out—but once they ignite, they can burn for days.

Wolfy Rougle

TEK CORNER

TEK (Traditional Ecological Knowledge) recognizes the symbiotic relationships between humans, plants, and landscapes. But nonhuman species can have special relationships with each other too. They co-evolved and grew up together, like a family. One important relationship in this ecosystem is between blue oak (c'awk'awi) and grey pine (to:ni). C'awk'awi and to:ni are “best friends,” or “companion plants” that help each other thrive. The deep taproots of c'awk'awi bring water up to help to:ni survive droughts, while to:ni encourages beneficial fungi to make nutrients available to both trees. Acorns from c'awk'awi and pine nuts from to:ni provide staple foods and culturally significant items for the Native peoples who tend this dynamic duo. You can remember them by thinking, “Tony and Chuck are best friends!”

Say:

c'awk'awi: Chalk - AW -wee

to:ni: TOH - nee (Just like “Tony”)

**TRY
THIS:**

See if you can spot these friends hanging out together on the landscape!

C'awk'awi has bluish, waxy leaves and big fat acorns. (You might not see acorns every year. Keep looking!) To:ni does not look like your typical Christmas tree. It has a thick top and skinny bottom, and tends to be tall and lurchy, with huge heavy spiky cones. In native woodlands, you can find these two hanging out about 10-20' from each other. They aren't the most attractive trees to some, but they have a beautiful friendship that lasts a lifetime!



Success story: *Big Chico Creek Ecological Reserve*

The history of fire in oak woodlands is best understood in the context of Indigenous stewardship. Like other ecosystems in the foothills, Indigenous peoples have used fire to steward for various objectives including grass and herb production as food, fiber, and medicine. When the Big Chico Creek Ecological Reserve was established in 1999, non-native annual species like yellow-star thistle and hedgehog dogs tail dominated the woodlands.

In 2007, culturally-based fire was reintroduced to select blue oak woodlands as part of a research project, but also to achieve specific objectives of enhancing native species habitat.

In recent years, larger cooperative burns have been completed with partner organizations, and some grant funding has been used to support those efforts, including:

- Prescribed fire.
- Education program built to implement forest health projects.
- Reduction of invasive species at the reserve.



Eli Goodsell



Sierran Mixed Hardwood

Here you'll find black oak, madrone, tan oak and bay laurel growing among ponderosa pine, Douglas fir, incense-cedar, and dogwood! This foothills forest is a beautiful place to live, but it needs regular fire and/or thinning to stay healthy and safe.



Sandra Richard/Flicker

Rainfall:

32 to 65 inches/year

Elevation:

1200 to 4000 ft

Fire return interval:

7 to 20 years

See healthy Sierran mixed hardwood:



Forest Ranch

Above: You could surely ride a horse in most any direction through this healthy black oak-ponderosa pine woodland. Right: Forest Ranch resident puts good fire under black oaks during a Prescribed Burn Association event.



Forest Ranch

Good signs of a healthy Sierran hardwood forest include:

- A healthy forest is a mosaic. It should have open areas, some denser areas, and lots of room to travel.
- A healthy forest is more “see-through” than many of us are used to. You should be able to *ride a horse at a gallop in any direction* and to see animals hundreds of feet away.
- A healthy forest has sunlight hitting the forest floor. Bunchgrasses and wildflowers like iris or warrior’s plume are often seen. Butterflies and birds visit a sunlit forest floor.
- The duff (layer of needles and dead stuff) is only a couple inches thick, and mushrooms are able to poke up through the duff. There are some dead and downed logs, but not a lot.
- Most trees are pretty big with a lot of room between them. Of course, there need to be young trees too. But a tree can easily live 150 years and only needs a single seed to grow to maturity to replace itself, so a thriving forest needs surprisingly few young trees.
- A healthy forest has large openings (a half-acre or more) full of grasses and flowers, or wet areas. Wildlife love these areas!

DID YOU KNOW?

A black oak tree doesn’t produce big acorn crops until it’s 80 or 100 years old. But when it does, one well-cared-for tree can easily produce 1,000 pounds of acorns. That’s 1,759,000 calories!

TEK CORNER

Black oak (**hámsym**) is a very important tree for many Maidu tribes. Its large, round, vertically striped acorns were a staple food source before colonization, and its saplings are often used as frames for baby cradleboards. Its durable hardwood trunks were used by Konkow and Mechoopda peoples as load-bearing posts for homes



Central Sierra Environmental
Resource Center

and ceremonial buildings.

Hámsym roots adapt to many different soil types, making them an ideal tree species for drought tolerance, climate variability, and erosion control.

**TRY
THIS:**

Spot the acorns!

Hámsym (black oaks) have very distinctive acorns! They are fat and round, with vertical stripes that make them look kind of like little beach balls. You know you're in a black oak woodland when you see these acorns.

Unfortunately, hámsym (pronounced "homm-simm") is not around as much anymore, and needs our help to return to its landscape. You can help hámsym by planting its acorns near the tree where you found them. Viable seed acorns do not rattle when you shake them, have no worm holes, and sink in water.

To plant an acorn, find a place with a bit of shade in the afternoons, and make a small hole about 1 inch deep in the soil (you can use a stick and twist it into the ground until you have made a hole). Plant the acorn pointy side down, with the flat end sticking a bit out of the ground.

Before, during and after a fire in Sierran mixed hardwood

Picture 1: When Sierran mixed hardwood forests don't burn for a long time, pine trees get an unnatural advantage. That's what happened on the slope on the right in picture 1.

If you grew up in that forest, you might even think it really was a pine forest. However, when these same forests are healthy and burning regularly, hardwoods thrive and can even become the dominant species. That's what happened on the slope on the left in the picture below.



Ali Meders-Knight

Picture 2 (page 15, top): Sooner or later, a very big fire comes through. That's what's happening in picture 2. Both slopes are burning. But on the healthy left side, some mature trees will survive and you can see a lot of healthy black charcoal. On the right side, the unhealthy dense pine forest is largely white ash, the sign of a high-intensity burn which kills most, if not all, trees.

Picture 2



Ali Meders-Knight

Picture 3: Several years after the big fire, the right-hand slope is slowly healing. It's more hardwood-dominated now. Shrubs are key helpers in fostering this transition.

Picture 3



Ali Meders-Knight

Is your Sierran mixed hardwood forest fire-resilient?



Care and feeding...

Unmanaged mixed hardwood forests have a dark, creepy appearance, with a closed canopy that does not allow sunlight to reach the forest floor. But well-managed ones are full of flowers, food, and medicine.

- Remove trees to create gaps in the canopy, letting lines of sunlight shine directly on the forest floor. You should be able to *ride a horse at a gallop in any direction* through most. You should be seeing animals several hundred feet away.
- Be aware of the strong probability that long-term fire suppression has given conifers an unfair advantage on your land. Consider keeping more oaks and targeting more conifers for removal, especially shade-tolerant ones like firs.
- If a hardwood tree has numerous thin trunks or stems (less than 4-6" diameter), you can thin to 1-3 stems if it feels right.
- Simply widening existing deer trails is a great strategy to work with your woodland's developing mosaic. Hint: look for deer scat and brush that has been nibbled down - the deer will have started the work for you.
- Fire mimicry is a great method of planning understory clearing. A good fire will burn at the base about 3-4 feet high. Cut all brush and dead limbs from the ground to this height to reduce ladder fuels.
- When you start to see wildflowers like warrior's plume or iris creeping along your forest floor, your forest is getting healthy.
- Invasive broom is one problem fire doesn't solve! Pull broom and put it in piles to die. Don't "chop and drop" or mulch it! Replace invasives with fire-adapted companion plants, which include ceanothus, toyon, hollyleaf redberry, currant, soaproot, bush sunflower, deergrass, and native wildflowers. For riparian areas, use cottonwood, box elder, alder, and willow.
- Once your forest is fire-safe, maintain it with regular fire. You can call your local Prescribed Burn Association for help.

My Sierran mixed hardwood forest burned— what now?

- 1) If your forest was moderately crowded, you probably lost some larger trees. Even so, almost all native hardwoods will resprout and don't need replanting. The resprouts will grow much faster than a new tree would. You can thin bushy resprouting oaks and madrones to 2-3 sprouts per stump, but wait 3-4 years to do this.
- 2) Don't try to replant every tree you lost. It's for the best if the future forest is more open than the last one. The long sightlines take some getting used to, but now you can see deer, birds and wildflowers you couldn't before. If dead trees are a hazard to roads or buildings, have them cut down safely. Use them for firewood, mill them for lumber, fell them on contours for erosion control, or just make piles for wildlife habitat. But if a tree wouldn't hurt anything by falling, there is little reason to remove it.
- 3) Conifers won't resprout. If you replant conifers, remember to plant seed from a warmer location (at least 500' below your elevation and/or one county to the south) for better climate resilience.
- 4) If your forest was very healthy before the fire, you may not need to do anything. You'll find some dead small-diameter trees and shrubs, and you can knock them over so they nourish and protect the soil. You don't need to replant anything.



What about riparian areas?

- **Keep logging equipment and other vehicles out of watercourses.**
- **Reduce erosion by getting wood on the ground; not just large logs on contour but plenty of “messy” slash and crushed dead wood.**
- **Dogwoods, elderberries and native *Vaccinium* species are great choices if you replant riparian areas.**

A tip for prescribed fire in Sierran mixed hardwood

How do you know if it's too dry or too wet to burn?

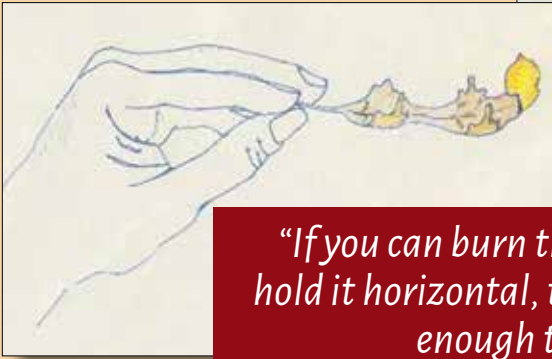
You can buy “10-hour fuel sticks” to measure fuel moisture in your woods, but what if your dominant fuel is leaf litter? Here's advice from Don Hankins, CSUC professor and pyrogeographer.

“Hold a leaf upright. If it burns readily from the top down, the fuels are very dry.”



! “Embers landing in leaves this dry could easily start new fires.”

“If you can burn the leaf while you hold it horizontal, then the fuel is dry enough to burn.”



“You can hold a leaf upside-down and light it from the bottom. If it won't burn or goes out easily, the fuel is too wet to burn.”





Success story: *Pine Ridge School*

In August 2018, the Butte County Fire Safe Council used grant funding to thin and masticate 11 acres of forest around the Pine Ridge School in Magalia as part of the Little Butte Creek Forest Health project. This project helped the school survive the Camp Fire three months later! These pictures show before the treatment, after the treatment, and after the impact of the Camp Fire.



*Before 2018
project*



*After
project
but before
Camp Fire*



Calli-Jane DeAnda

*After
Camp Fire*

Mixed Conifer Woodland

The mixed conifer woodland is a land of sugar pine, Douglas fir, incense-cedar, and even white fir. It still has oaks on south-facing slopes or openings. In the understory you'll find currants, chinquapin, and tan oak.

There's snow on the ground for much of the winter here. Summer days are 20 to 30 degrees cooler than in blue oak country! Fires here are less frequent—perhaps every 10 to 50 years—but they still play the same important role of creating snags, opening up meadows, and germinating new life.



Wikimedia Commons

Rainfall:

60+ inches/year

Elevation:

4,000 ft

Fire return interval:

10 to 50 years

Mixed conifer woodlands have a complex and intriguing relationship with fire. South-facing sites may burn much more frequently than north-facing sites.

An example of healthy mixed conifer woodland:



Above: This thinned forest in Cohasset is ready for an underburn!



Signs of a healthy mixed conifer woodland include:

- It's called "mixed" for good reason! Ponderosa and sugar pines, cedar, fir, liveoak, black oak, and tanoaks all belong here.
- You should be able to *ride a horse at a gallop in any direction*. You should be able to see animals several hundred feet away.
- Sunlight should reach the forest floor. Beargrass, currants, creeping manzanita, huckleberry, wild lilac, elderberry, bunchgrasses and paintbrush are all signs your forest floor is getting enough light.
- The duff and dead stuff should not build up too deep. If it gets deeper than two or three inches, it's time for an underburn! Mushrooms should be poking their heads up on top of the needle layer, not under it!
- Ready to take healthy forest thinning to the next level? Work up the courage to open up a clearing in your forest and watch the wildlife flood in!



Magalia

Calli-Jane DeAnda

Mixed conifer forests with black oaks.

What about riparian areas?

Alders, willows, cottonwoods and elderberry are all important trees that only grow in riparian areas. If you are lucky, you may have a family of beavers come to live on your land. Beaver dams are critical to forest health. They slow water, recharge aquifers, and protect riparian areas from too-intense fire. The small number of trees beavers cut down is more than paid for by the millions of acres of resilient forest they can save!



Calli-Jane DeAnda

An overgrown mixed conifer forest in Forbestown.

Healthy forests are full of flowers, fruit, mushrooms, and deer.



The Cohasset forest at right has had a lot of thinning done and is ready for an underburn. A “good” fire will burn up much of the needles and duff, leave charcoal on the ground, consume dead wood and pests, and likely kill most of the young incense-cedar seedlings you see in the foreground -- which is OK. A healthy forest actually has surprisingly few young trees!



Calli-Jane DeAnda



This forest near Magalia Reservoir lost a lot of trees in the Camp Fire.

Is your mixed conifer woodland fire-resilient?



Care and feeding...

Unmanaged conifer woodlands are an extreme wildfire hazard. Historically, conifer forests were widely spaced and maintained with controlled fire to open up the understory and prevent crown fires.

- Mature trees should be about 20-25 feet apart, 70-120 trees per acre maximum. The goal of thinning should be that there are gaps in the canopy between trees, allowing lines of sunlight to shine directly on the forest floor.
- All young saplings within the dripline of mature trees should be removed. A healthy Sierran forest really has surprisingly few young trees! Also, remove any conifers growing within, or overtopping, aspen or cottonwood stands.
- Fire mimicry is a great method of planning understory clearing. A good fire will burn at the base about 3-4 feet high. Cut all brush and limbs from the ground to this height.
- Cut broken, dead and sickly limbs that appear to be competing for canopy or suffering from lack of sunlight. Think of it as giving the tree a good pruning to encourage vertical growth.
- White fir and Douglas fir are more shade-tolerant and have an unfair advantage when the forest is fire-suppressed. To select for the trees that will be most resilient in a warmer and more fiery century, choose sugar pine, ponderosa and Jeffrey pine, and oaks where you have them.
- By all means, enlist the help of a forester or your local Fire Safe Council or RCD. Thinning your forest back to health is unlikely to make you rich but you can sometimes break even, given the right market and programs.
- A healthy forest has openings! If your land has a flatter area full of crowded young pine or fir saplings, you may have an old meadow! Don't just thin the forest— create some patches that have few or no trees at all. You might be amazed to see how the wildlife flock to this new opening.

My Sierran mixed hardwood forest burned— what now?

- 1) If half or more of your trees are dead and you do nothing, you are going to have a huge fuel mess in a couple of years. Remove trees that are dead or dying because burned trees pose a threat to life or property. To prevent high tree removal costs in the future, consult your local forester for advice on timely tree removal soon after the fire to salvage remaining value in the trees.
- 2) If your forest burned at high severity and most trees seem to be top-killed, pursue erosion control. If you have steep slopes that are exposed now, consider staking wattles or consider felling some trees. Check pages 32-35 for resources.
- 3) In the second year, you'll see hardwoods resprouting. Don't replant new trees within 20 feet of these hardwoods, like black oak or madrone. If you follow this rule, you might find that you end up replanting very few trees. And that's okay. Your future forest might have a lot of oaks! The future is likely to be warmer and drier, and oaks will do very well compared to most conifers.
- 4) By the spring of the third or fourth year, you may have an idea of where you want to plant trees. If you see "volunteer" baby pine trees, keep them and don't plant within 10 feet.
- 5) When replanting, plant trees with 20-foot spacing. Choose trees grown from locally-adapted seed. That means seed from your seed zone and elevation, or slightly warmer. If you live at 4,000 feet, try to find seedlings from 3,000 to 3,500 feet in Butte or Nevada Counties. The future probably won't be colder, so don't plant trees from higher elevations.

**DID YOU
KNOW?**

Burned forests are special: as rare and biodiverse as old-growth. They are only here for a moment—temporary sanctuaries for creatures that need them, like elk, fire poppies, and black-backed woodpeckers.

“Good fire” in mixed conifer woodland

Fire and water are opposites, right? Well, just like water wants to go downhill, fire wants to go uphill. You can force fire to slow down and be gentler if you can force it to travel downhill.

How? Light your fire just below

a barrier the fire can't burn, so your fire has no place to go but down. You can light just below a road or trail, an area you've wet

down with a hose (wetlining) or an area you've previously burned (blacklining). Fire traveling uphill is called “head fire.”

It's much harder to manage than downhill-bound “backing fire.”

Fire can move sideways too: that's “flanking



Text: Wolfy Rougle Art: Calli-Jane DeAnda

fire” and fire does some of its “best” work that way!



TEK CORNER

Sugar Pine (Mountain Maidu: **sumum cham***) is a native tree that can grow over 200 feet tall and 11 feet thick! Most people have never seen old-growth sugar pine because so much was cut during the Gold Rush. Native peoples used cultural burning to clear brush around sugar pines and maintain a widely spaced forest structure. This helped trees grow big and reduced pests on the sugar pine's beautiful giant cones and its nutritious seeds. You can see some nice good-sized sugar pines if you go up over Humboldt Summit, above Jonesville. Sugar pines are a very important species to preserve when thinning woodlands.

*Credit: Farrell Cunningham (Mountain Maidu) as quoted in the Living Wild Project, <https://www.livingwild.org/wild-food/culture/>.

TRY THIS:

Bead art with pine nuts

If you find one of **sumum cham**'s enormous cones, see if you can find pine nuts inside! Remove the papery wing from the nuts and rub them with a little oil to make them shiny. You can make beads from them by drilling a hole through each end and stringing them together.



Wolfy Rougle



Success story: Paradise Lake

In spring 2018, the Butte County Fire Safe Council secured a Sierra Nevada Conservancy grant and teamed up with the USDA Forest Service to thin 176 acres of overgrown forest around Paradise Lake in Magalia. By following up a timber harvest with some mastication and a community “Adopt-a-Forest” day, the community was able to keep the lake and its drinking water safe from the destruction of Camp Fire later that year.



Calli-Jane DeAnda



Benefits of biochar

If California's forests used to burn all the time, how on earth did they still store carbon? The secret is biochar - the black, porous, extremely durable form of carbon that patchy and moderate fires leave behind. Many societies across history have known how to use biochar to supercharge soils with fertility and water. To make biochar, build your piles with larger diameter wood on the bottom, kindling-type material on the top. Then light them from the top. Douse your piles with water before combustion is complete, and you'll be rewarded with a rich black soil amendment. These piles can be made in the open or in a metal "biochar kiln," which is like a big square iron feed trough with a drain in the bottom to let water out.



At left: Biochar expert Kelpie Wilson lights a pile from the top at a Yankee Hill Fire Safe Council demo. Note the well-raked burn area. In the back, a biochar kiln is seen. Below: The reward for a pile well burned!



Wolfy Rougle, BCRC

Myxomphalina maura is one of many fungi who love to help cycle nutrients in newly burned areas!



Restoring a Resilient Forest

Reducing canopy cover to 70% balances fuel loading while maintaining enough shade to suppress regrowth. In areas of 70% canopy cover, fuels reduction retreatment intervals are ideally 10 years.



Treatment types:

- Mastication
- Hand cutting and pile burning, chipping or scattering
- Grazing
- Prescribed burning



Butte County Fire Safe Council and Sierra Timber Services

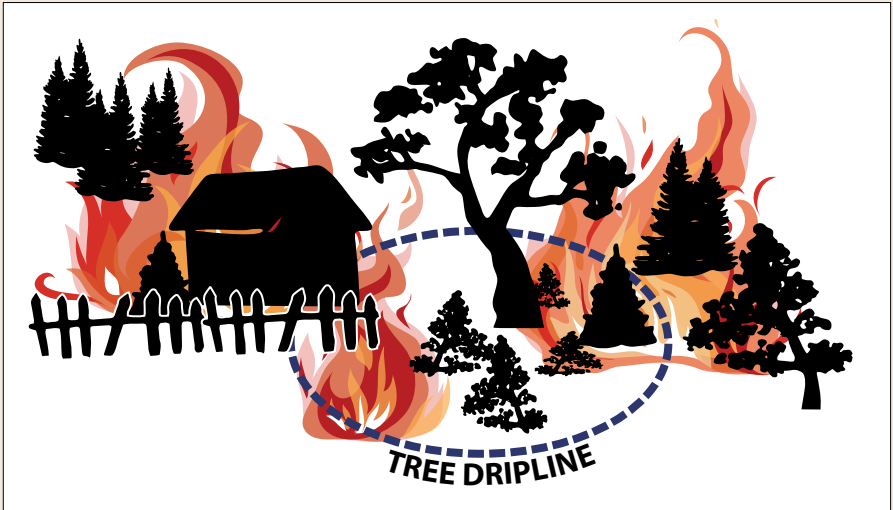


Community Involvement

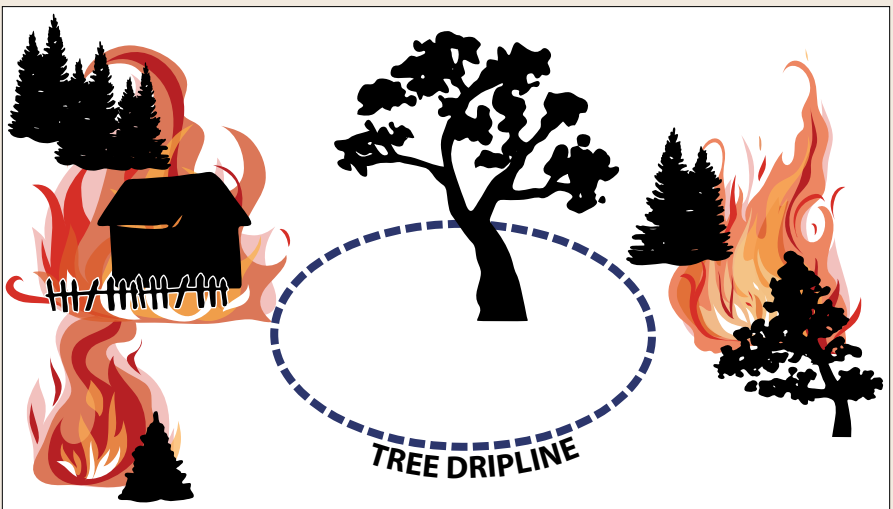
Fuels reduction is most effective when carried out across multiple land owners. Working together as a community is a key strategy for reducing wildfire risk.



What you can do to help your trees not burn:



Help save your trees from wildfire. Keep shrubs, sheds, smaller trees and undergrowth away from the tree's dripline (see below).



Programs and Organizations



The **Butte County Fire Safe Council** and the many other local Fire Safe Councils work to help you get fire-ready. They can chip brush around your home, make evacuation routes safer, provide Go! bags and education, help you harden your house and much more.

(530) 877-0984 · www.buttefiresafe.net



The **Butte County Resource Conservation District** helps landowners write forest management plans or restore forests after severe fire. They lead the **Butte Prescribed Burn Association**, a co-op where neighbors help neighbors get good fire on the ground!

(530) 693-3173 · www.bcrd.org
forestry@bcrd.org; goodfire@bcrd.org



The **Natural Resources Conservation Service** motto is, "Helping people help the land." They link landowners with federal dollars that cover wildlife habitat improvement and fuels reduction.

(530) 534-0112 ext. 3,
150 Chuck Yeager Way, Oroville

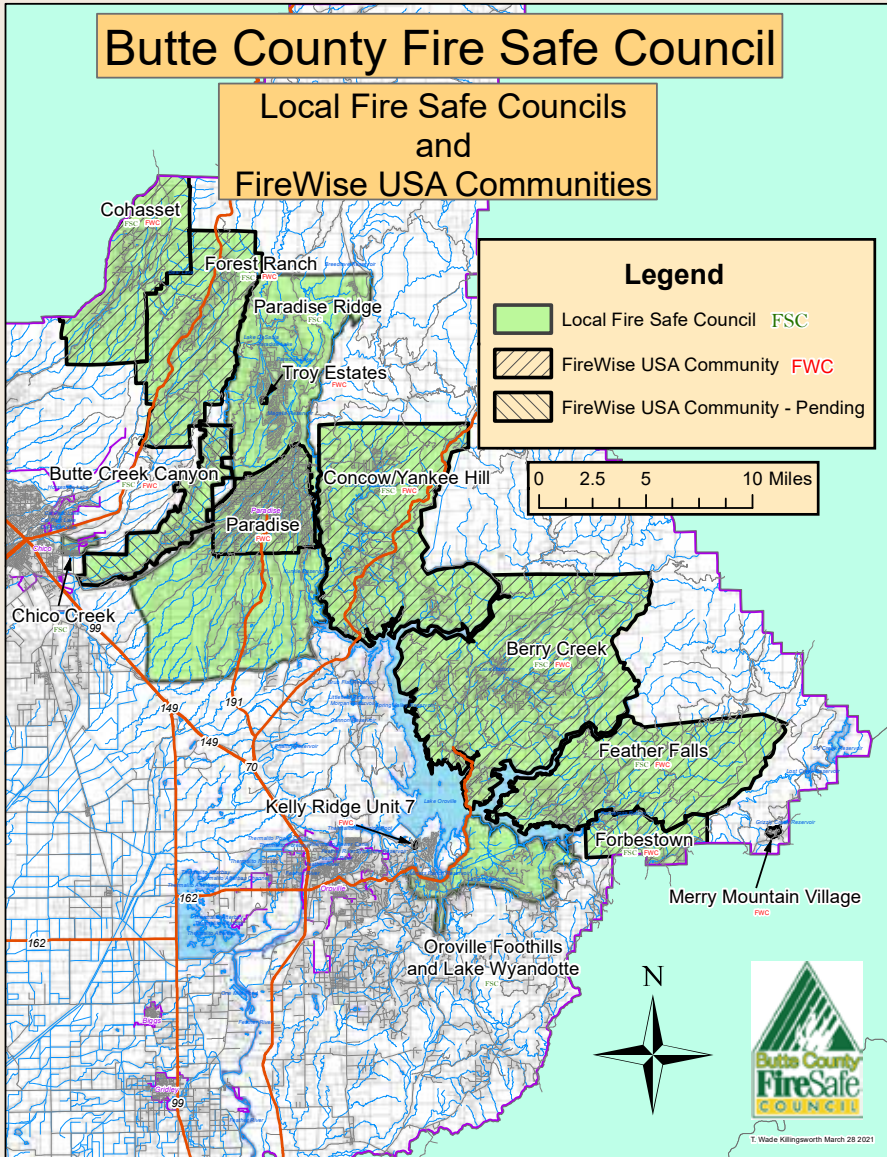
Local Fire Safe Councils:

Forbestown
Berry Creek
Yankee Hill
Lake Wyndotte
Paradise Ridge
Forest Ranch
Cohasset

Local Firewise USA Communities


Merry Mountain Village
Troy Estates
Forbestown
Berry Creek
Yankee Hill
Paradise Ridge
Forest Ranch
Cohasset


Local FSC's and FireWise communities





Where to find plants:

 **Floral Native Nursery** is in Chico and has an outstanding selection of locally adapted, native, fire-resilient trees, grasses, shrubs and flowers. They will custom-grow large orders for you!
(530) 892-2511, floralnativenursery.com

 **Jonsteen Nursery** is a good source for retail forest trees. Ask for trees grown from Butte County seed.
(707) 839-1067; www.jonsteen.com

 **Butte County Resource Conservation District (BCRCD)** gives away hardwoods (like oaks) every fall, conifers (like pines) every spring, along with education to help you replant in a resilient way.
www.bcrccd.org or follow on Facebook.

 **Cornflower Farms** is a native plant nursery in the Sacramento area.
(916) 689-1015; cornflowerfarms.com.

 **Cal Forests Nursery** is a source of high-quality forest trees for large orders. Ask for trees grown from Butte County seed, or have them custom-grow large orders for you.
www.calforest.com

Where to find seeds:

Don't buy "wildflower mix." Even "native species" of grass and wildflower aren't very helpful if they're not native to your watershed in Butte County. Ask neighbors if you can gather or exchange seed, or ask BCRCD or a local Fire Safe Council for help collecting seed from a nearby unburned watershed.

Learn more about native plants:

Butte County Resource Conservation District
www.bcrccd.org/fire-recovery-resources-for-landowners

California Native Plant Society • www.cnps.org/gardening

UC Master Gardeners of Butte County • ucanr.edu/sites/bcmg

Paradise Garden Club • paradisegardenclub.org

What does high severity fire look like?

In Berry Creek, at right, you can see nearly 100% tree and vegetation mortality from a high severity wildfire.

These forests weren't thinned before the fire and, because of that, they burned too hot and suffered extreme mortality, causing an impact to soil and, eventually, erosion.



Taylor Nilsson

What is the cost of doing nothing?

Hazardous tree removal is necessary in the WUI after a high severity wildfire because the burned trees pose a risk to health and safety.

Additionally, removing hazardous trees allows for replanting and helps



prevent severe fire in years to come by removing fuels. The cost to remove one tree post-fire may range between \$500 and \$5,000. It is far more economical to remove small trees before a wildfire happens.

Why would anyone cut down a tree?

A managed forest is more likely to survive wildfire than an unmanaged one. Cutting, limbing, and removing trees, branches and brush is likely to protect nice, big trees from fire-related mortality.



Calli-Jane DeAnda



The forest at left never was thinned prior to the North

Complex Fire so it was too dense. It burned at high severity as a result. Most, if not all, of these trees died.

**With proactive land management,
trees are harvested to:**

- Produce wood products
- Reduce fuel loads
- Increase safety

This removes excess trees to give remaining trees enough water and sunlight to thrive.



Callie-Jane DeAnda

CELEBRATE

with Ready Raccoon!

Wildfire Ready Raccoon is the cheerful mascot for both the Paradise Ridge Fire Safe Council and Butte County Fire Safe Council. Ready Raccoon promotes fire safety and educational firesafe programs for local children. Ready Raccoon makes frequent appearances at local events and has his own book, Facebook page and, now, a rap song and an accompanying video!






Watch the video here: buttefiresafe.net/wildfire-ready-raccoon-rap/

About this booklet

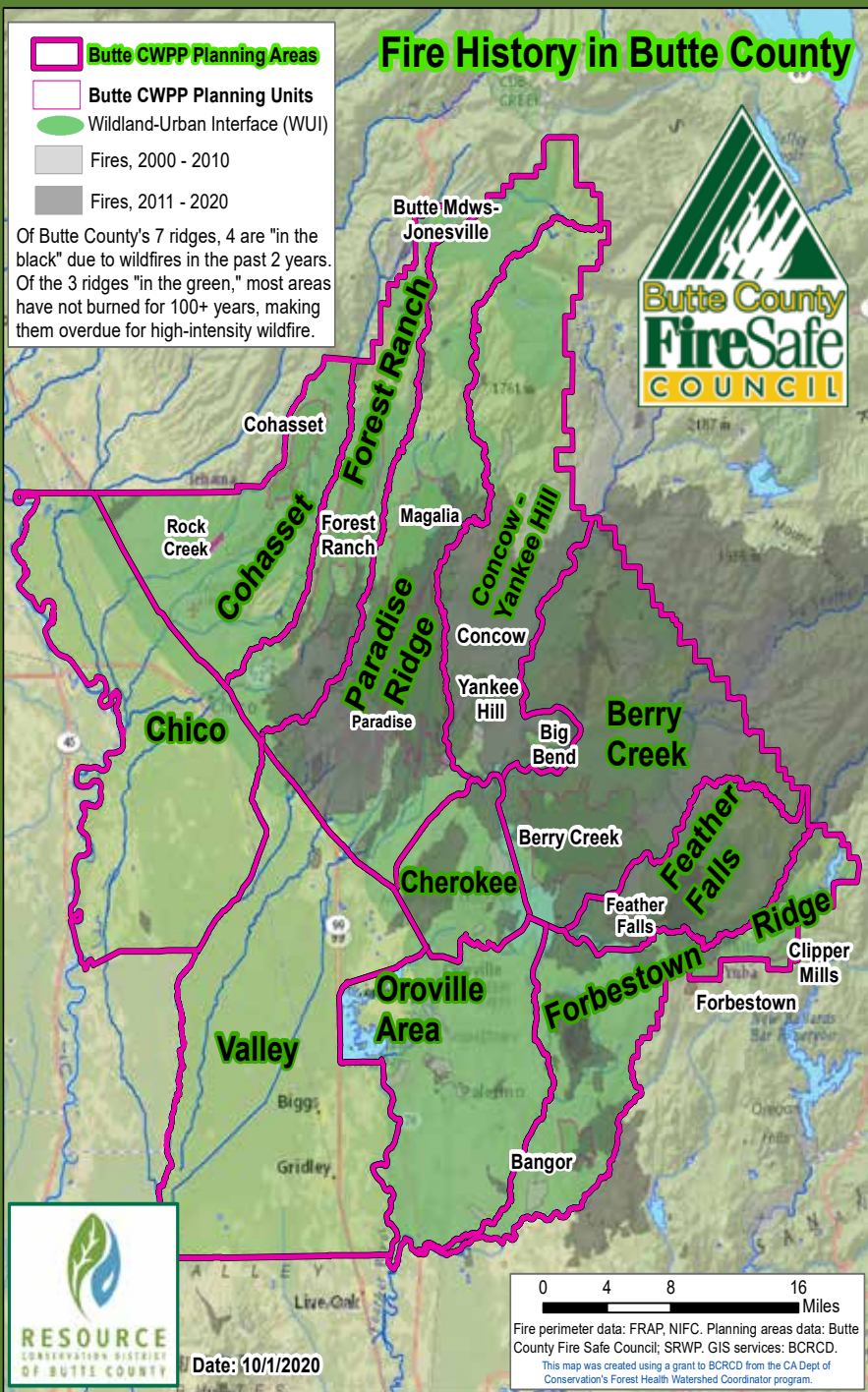
- Created by:* Butte County Fire Safe Council and
Butte Resource Conservation District
- Cover:* Miriam Morrill; Pyrosketchology.com
- Design/printing:* Cedar Creek; 530-872-0850
- With help from:* Chico Traditional Ecological Stewardship Program

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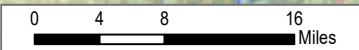
Fire History in Butte County

-  Butte CWPP Planning Areas
-  Butte CWPP Planning Units
-  Wildland-Urban Interface (WUI)
-  Fires, 2000 - 2010
-  Fires, 2011 - 2020

Of Butte County's 7 ridges, 4 are "in the black" due to wildfires in the past 2 years. Of the 3 ridges "in the green," most areas have not burned for 100+ years, making them overdue for high-intensity wildfire.



Date: 10/1/2020



Fire perimeter data: FRAP, NIFC. Planning areas data: Butte County Fire Safe Council; SRWP. GIS services: BCRCD.

This map was created using a grant to BCRCD from the CA Dept of Conservator's Forest Health Watershed Coordinator program.

*Help your forest thrive and survive wildfire—
learn more inside!*