



## Forest Stewardship Education Newsletter August 2022 Post-fire Resilience

### Greetings from UC ANR

Fire season is in full swing. With active forest management and good luck, I hope you all will be spared from the most severe effects of fire. Unfortunately, even with proper planning and execution, luck is not always on our side. This month's newsletter is focused on post-fire resilience. Specifically, information and resources for landowners who are considering post-fire 'next steps'. Even if you have not experienced fire on your forestland, this information is helpful when considering your goals and objectives, and what management activities you might need to consider before a fire strikes.

I also want to return to a definition of 'resilience' provided by Ryan Tompkins, UC ANR Forestry and Natural Resources Advisor. He shared that 'resilience' is a measure of adaptability and focuses on an ecosystems essential structure and composition to a range of stresses. Though this newsletter is focusing on high-severity fire as the stressor, we know forests are under stress from a variety of sources. How we manage for one stressor will have an impact on the effects of others.

Lastly, I have included information on a new workshop series Susie Kocher, UC ANR Forestry and Natural Resources Advisor, is hosting with the goal to increase outreach, education and technical assistance to California's private forest landowners affected by recent wildfires. Check it out!

Be safe everyone!

Cheers,  
Kim Ingram, Forest Stewardship Coordinator



**Understanding the range of impacts on your property (after a fire), can help you decide where and when to take action to protect your land from further impacts and to recoup losses. - Recovering from Wildfire: A Guide for California's Forest Landowners**

## **Fire severity guides landowner's next steps**

Fire severity is defined as the magnitude of ecological change from pre-fire conditions. Depending on the amount of live biomass killed, fire severity is categorized as low, moderate or high. Within a fire footprint, fire severity can vary depending on but not limited to, pre-fire soil and vegetation moisture levels, overall stand health, and the time of day and weather conditions during the fire event. Each fire severity category has different ecological effects and therefore different post-fire management strategies, both immediately after the fire and in the long-term. For landowners who experience a fire event, assessing fire severity and impacts will help you determine your next steps.

[Recovering from Wildfire: A Guide for California's Forest Landowners](#) describes the ecological effects and landowner concerns for low, moderate and high severity fires.

### **Low-severity fire**

*Ecological effects* - In California, most mixed conifer, oak woodland and redwood forests are well adapted to low and moderate-severity fire. Having evolved with frequent fire, species adaptations include thick bark, self-pruning limbs, serotinous cones or post-fire sprouting from epicormic buds and roots. As tree density is reduced and the forest floor is opened up, the remaining trees benefit from the reduced competition and greater available resources and can increase their overall growth and vigor. Additionally, the reduction in accumulated surface fuels reduces the risk of severe fires in the future.

*Landowner concerns* - Low-severity fires typically remain on the forest floor. After a low-severity fire event, landowners may notice scorched needles and bark, but the majority of the canopy cover will be green. Fire consumed small trees and vegetation as well as falling leaves and needles from standing trees, will provide natural mulch to the forest

floor reducing erosion risks. Unburned seeds, roots and crowns of grasses and shrubs will re-establish naturally over the next few months and years. Some individual trees may have been more severely impacted, and should be monitored over time for pest and disease infestation or other hazardous conditions.

### **Moderate-severity fire**

*Ecological effects* - Like low-severity fire, moderate-severity fire can benefit remaining trees through the reduction in overall tree density and surface vegetation which increases resources and decreases competition. However, it will have areas that burn hotter and move into the tree canopy. This creates variability in the forest structure, with open patches and clumps of trees. This variability is important for many wildlife species.

*Landowner concerns* - In areas that experienced canopy fire, landowners will need to assess whether those areas need immediate attention (i.e. near infrastructure, possibility of salvage) or if left alone, they will provide desired wildlife habitat without compromising safety. In areas that are now more open, landowners will need to consider their forest management goals and objectives. Are you comfortable with the open areas as is? Maybe the area has released oaks or removed competition to allow for pine rejuvenation? Maybe you now have the ability to plant desired species or conduct other projects that you could not before? As some individual trees may have been more severely impacted, landowners should monitor them over time for pest and disease infestation or other hazardous conditions.

### **High-severity fire**

*Ecological effects* - Research suggests that before fire exclusion efforts, high-severity fire occurred on a much smaller scale than occurs today. When it did occur, it released nutrients into the soil, produced standing and fallen snags that are important for certain wildlife species, and the subsequent shrub fields that dominated small areas of the landscape introduced diversity across the larger landscape.

However, with today's increasing size of high-severity fire, negative ecological impacts more often outweigh the positive ecological impacts. Larger high-severity patches lead to an increase in loss of forested habitat for wildlife and forest regeneration is delayed due to the loss of seed trees over large areas. Shrubs become dominant and leave little room or resources for tree seedlings. Forest soil is heated to the point where seed banks and nutrients are lost or unavailable. Forest litter, which could otherwise mitigate the effects of erosion, are also eliminated. As dead trees and shrubs fall, they become fuel for the next fire.

*Landowner concerns* - High-severity fire results in the loss of timber, recreational and scenic values. For those that live on their forestland, losses can include homes, personal effects, and a sense of well-being. Landowners need to be more vigilant about identifying hazards such as dead trees, erosion, flooding, and damage to infrastructure. Landowners should reach out to natural resource professional to help them assess the damage to their forestland, understand and

implement post-fire management activities, and evaluate and re-frame their forest management goals and objectives.



Forest with clumps and gaps post-fire



Wildland fires often burn in a 'patchy' fashion, and this creates a wide variety of effects in the forests they are burning. This video uses current post-fire satellite imagery collected on 9/6/2021 to discuss the vegetation effects of the Caldor Fire. They also talk about how terrain, weather, and timing affect patterns of burn severity, and about land management after fires.

This video is a production of The Lookout ([the-lookout.org](http://the-lookout.org)), a user-supported wildfire reporting and education initiative run by Zeke and Erika Lunder, in Chico, California.

**Decisions about mitigation actions will likely focus on the areas of greatest change, and where tree mortality is the highest. - Recovering from Wildfire: A Guide for California's Forest Landowners**



Forest road in need of crossing and culvert improvement

## Post-fire Management Concerns

Depending on fire severity impacts, landowners will need to consider various post-fire safety concerns and management issues. This may include:

- damage to homes, other structures and infrastructure
- damage to roads and culverts
- the potential for flooding and soil erosion
- impacts to water courses
- hazard tree removal
- viability of salvage timber harvest or other fuel reduction methods
- reforestation/revegetation with site prep
- forest management work under state exemptions
- financial opportunities for post-fire work (grants, cost-share)
- financial or business impacts (economic losses, applicable tax laws, record keeping)

There has been a lot written on each of these issues. We will review a few of these and re-visit others in future newsletters.

### Road assessment

Roads can be damaged during a fire (burned fill base and destroyed plastic culverts) as well as from post-fire activity (eroded road base and plugged culverts). Mitigating damage starts with an assessment of the road's condition, including drainage, pre and post-fire. Recovering from Wildfire: A guide for California's Forest Landowners outlines mitigation options to protect your road system and nearby water courses.

Mitigation options include:

- Placing riprap around the culvert inlet to prevent erosion (armoring)
- Construct rolling dips (gentle and gradual depressions) or waterbars (dip and hump - like a speedbump) on road surfaces that will funnel surface water to drain on the roadside
- Remove berms on the road's outside edges to prevent water from collecting
- Install trash racks at culvert inlets to prevent debris from clogging the culvert
- Install sediment traps below culverts to prevent sediment from leaving the site

Post-fire, monitor your road and culverts, watching for erosion, clogged ditches and culverts, and surface damage that could indicate road bed issues.

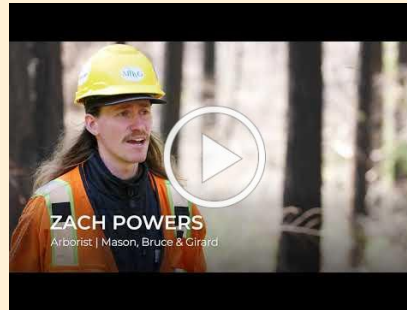
More information on forests roads can be found in the [Forest Stewardship Series 17: Forest Roads and Rural Roads: A Construction and Maintenance Guide for California Landowners](#).

### Hazard tree removal

It is not always obvious what trees have succumbed to fire and what trees may need a little time to recover. In the [November 2021 Forest Stewardship Newsletter](#), we cover assessing post-fire tree mortality. Factors such as the tree species, the size/age/vigor of the tree, the health of the tree before the fire, and the extent/location of the injury can play a role in fire survival.

Measuring the damage caused by the fire to the cambium, crown, and roots

gives us additional information to predict the survivability of a tree. A tree becomes a hazard when the tree is weakened by fire or has died, and is at risk of falling on people, structures, trails or roadways. Hazard trees should be cleared sooner than later and before any other work is done on the property. If an individual dead or dying tree poses no safety risk, it can meet a landowner objective for wildlife habitat by being left standing (a snag).



Certified Arborists, Foresters and Oregon Department Of Transportation leadership from the Debris Management Task Force explain the evaluation process and criteria that are utilized to assess each individual tree in fire-affected areas.



This webinar covers fire impacts on oak woodlands, rangelands, orchards and vineyards, plus restoration and erosion control options, and financial assistance programs.

Roles of NGOs in Wildfire Relief and Recovery

Fire Severity Impacts on Plant Species Richness

Effects of thinning and prescribed fire on tree survival

## Q&A with Paul Asmuth, Forest Stewardship Workshop Participant and 2020 Glass Fire Survivor

Q: Before the Glass Fire, what type of forest management work had you done on the property?

A: *After the 2017 fires that occurred in Napa and Sonoma Counties, we began a process of reducing fuel loads within our forests. This included removal of dead trees both standing in the canopy and on the forest floor. We also limbed up existing trees to reduce ladder fuels and removed small Douglas fir trees under 6" dbh. In addition, we went around every building on our property with CalFire and removed trees/bushes recommended to increase defensible space.*

Q: How did those managed areas fair from the Glass Fire?

A: *When the 2020 Glass Fire burned through this area, the flames stayed*

*on the forest floor and did not rise up into the canopy. There was still tree loss of the Douglas firs which have low fire resistance. The oaks, big leaf maples, California bay, toyon and other fire adapted species experienced some top kill and basal sprouted.*

Q: What were your initial concerns?

A: *Loss of lodges, homes, and a mature forest.*

Q: What were the initial steps/actions you took post-fire?

A: *We met with the Napa RCD forester, Amanda Benton, to evaluate our forest. There were many structurally damaged (hazard) trees that were dangerous, as well as thick ash layers covering holes from burned roots.*

Q: Whom did you receive technical assistance from initially post-fire?

A: *The RCD, as well as Russell Kobayashi, RPF with North Coast Resource Management. They helped address all of my initial concerns.*

Q: What are your long-term concerns?

A: *The forested areas of our neighbors that had even-aged, very dense Douglas fir forests experienced extensive crown fires where everything was burned. Clearing the land of these dead standing and fallen trees will take time and is expensive. In addition, there are still trees falling on occasion almost two years later from structural fire damage that is hard to determine.*

Q: What long-term strategies or plans did you develop for the areas that burned?

A: *With RCD and RPF assistance, we cleared the dead trees through a CalFire Emergency Timber Harvest Plan, chipped, or cut and burned trees that we were unable to send to the mill. We also had to start an eradication program along with our neighbors for French Broom, an invasive species that is highly flammable. In addition, we coordinated with 10 of our neighbors to bring in 1,100 goats and 100 sheep to graze 300 acres. After two years of growth, there were some areas with grasses/weeds up to 4 feet tall. We are very pleased with the grazing results and will consider again in the future.*

Q: Is there anything you wish you had done differently?

A: *Logging the dead Douglas fir was expensive and with the closest mill accepting these trees 1 1/2 hours away in Ukiah, this was a big decision. However, the other choices of cutting and burning is also expensive and has additional environmental issues.*

Q: Are there post-fire topics or issues you wish you had known about before the fire to make addressing your initial and long-term concerns a little easier?

A: *Understanding the likelihood of invasive species infiltration, as well as post-fire insect infestations that are now killing ponderosa pine and Douglas fir that survived the fire, and how the fire caused so much structural damage to trees that looked healthy.*



One month after the fire showing low-intensity fire effects on oaks in treated area. Note a few green leaves higher up and dead leaves on the ground acting as mulch.

**The forest needs annual maintenance. Eliminate ladder fuels, use prescribed fire where you can and consider goat/sheep grazing to reduce fuel loads. - Paul Asmuth**



Replanting conifers post-fire

### **Post-fire Forest Resilience Workshop**

The University of California, with funding from the US Forest Service Region 5, is hosting a 6 week post-fire forest resilience workshop series starting September 6th through October 14th.

### **Recovery of People and Communities: Disaster Recovery Framework**

In 'Resident and community recovery after wildfires', authors Tara McGee, Sarah McCaffrey and Fantina Tedim apply a phases of disaster collective reactions model to post-fire recovery in residents and communities.

The authors describe how residents typically go through 3 phases:

1. Honeymoon period - with community cohesion and emotional highs, people pull together to share resources and support one another;
2. Disillusionment - continued stress and

Participants will attend weekly evening zoom sessions (Tuesdays) and 1 in-person field day at either the Dixie, Caldor or Tamarack fires.

Participants will learn about managing forestland after wildfire. Including:

- Increasing disturbances in Sierra Nevada forests;
- Post-wildfire issues: erosion, invasives, hazard trees, fuels;
- Time frame and steps needed for reforestation;
- Landowner support groups and financial assistance;
- Safety and erosion control for the short and long term;
- Dealing with dead trees/ salvage logging/ slash treatment;
- Reforestation/seedling orders/ climate change/ planting;
- Dealing with competing vegetation and on-going maintenance; and
- Getting professional help and cost-share opportunities

Though open to all, this series will focus on mixed-conifer, Sierran ecosystems. Workshops for coastal redwood communities and oak woodlands are in the planning phases.

Registration for the workshop is \$25.

Sign up now at:  
<http://ucanr.edu/post-fireworkshops>

For questions, contact Susie Kocher, [sdkocher@ucanr.edu](mailto:sdkocher@ucanr.edu).

emotional lows lead to survivor's remorse, and conflict and blame over clean-up, perceived inadequacies of firefighting efforts or post-fire aid availability and distribution; and

3. Reconstruction - periods of continued distress and setbacks as residents adjust to the 'new normal', social cohesion may continue, and more attention is given to future fire prevention or mitigation efforts.

The authors follow-up by illustrating how communities typically go through 2 phases:

1. Early restoration - focuses on replacing lost assets and getting back to 'normal' as quickly as possible which may include efforts to streamline rebuilding processes; and
2. Building back better - which provides an opportunity to carefully plan for future fire preparedness and mitigation, which may include setting new construction standards.



Youth from Tahoe Turning Point plant aspen in the Angora burn

## A few other items of note...

- Have you had your initial site visit with an RPF, Burn Boss or Certified Range Manager? There is still time! No matter which workshop you participated in (even back in 2020!), if you completed the workshop, you are eligible. Need to make up a session in order to qualify, we can arrange that. Don't let this opportunity pass you by! Contact Kim Ingram at [kcingram@ucanr.edu](mailto:kcingram@ucanr.edu) for more details.
- The California Department of Forestry and Fire Protection (Cal Fire) recently reopened its container seedling nursery operation in Davis. The Lewis A. Moran Reforestation Center now has an annual seedling capacity of nearly 250,000 seedlings and are working on a goal to produce over 1 million seedlings in the near future. At this time, they are taking seedling orders for the 2023 sowing season. Two rounds of seedling request screenings will be in mid-July and mid-September to prioritize and approve orders to begin sowing in late winter to early spring. **For seedling requests related to post-fire reforestation, seedlings will be free, courtesy of a grant from the United States Forest Service.** For more information on the ordering process or to place a seed or seedling request, please visit: <https://www.fire.ca.gov/programs/resource-management/resource-protection-improvement/wildfire-resilience/reforestation-center/>.



For more information on the workshop, and to share with a friend, please visit: <http://ucanr.edu/forestryworkshopregistration>

### Upcoming Forest Stewardship Workshops and Field Days:

- August 24th - October 19th, Amador- Calaveras Co-hort, Online and in-person field day (September 17th)
- September 18th, Small Forest Landowner Field Day, Twain Harte, CA. Co-hosted by My Sierra Woods and the Forest Stewardship Education Program. Register [here](#).
- October 18th - December 13th, Butte Co-hort, Online and in-person field day (November 5th)





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