



Fire has entered our lives. It first tapped on our shoulder as we recycled those colorful brochures on fire preparedness. Then it pounded on our door with stories of increasingly severe infernos across the state. Finally it stormed into our communities, yards, homes and intimate awareness with the CZU August Lightning Complex Fire becoming the State's ninth most destructive fire to date.<sup>1</sup> It has burned and killed and destroyed so much of what we love. Yet if these were low-severity fires they would beneficially prune plants, recycle nutrients and renew biodiversity without destroying so many homes, which instills mixed feelings about this flaming element.

In contrast, water has always been a fundamental necessity for all life. It also douses fires and therefore becomes a vital component in fighting wildfires. However, once wildfires are contained and extinguished, their effects continue. Burned water lines allow leaks through which fire-related contamination can enter and maneuver past the water meters into the public water system.<sup>2</sup> This, in fact, occurred during the CZU wildfire and released volatile organic compounds or VOCs into the water systems of the upper San Lorenzo Valley, and for some, it led to contaminated drinking water. In an ideal world, our water supply would meet all of our fire-fighting needs while remaining safe from the flames itself. But in the case of the CZU fire, we fell short of this ideal.

### **Lightning and Heat Waves are a Deadly Mix**

Many local residents awoke in the early hours of Sunday, August 16, 2020 to strong winds and the sound of thunder. Some stayed up to watch the 14,000 lightning strikes<sup>3</sup> that lit the night sky in a firework display. During the driest part of the year, more than

900 fires ignited in the tempest and fed on the abundant fuel.<sup>4</sup> Then, a heat wave further fed the flames and united the multiple fires into a lightning complex, capped with initials that Cal Fire branded as CZU. The first evacuation orders came Tuesday afternoon, August 18<sup>th</sup>.

For residents of the San Lorenzo Valley, the first public sign of this wildfire's severity occurred at the Wednesday, August 19<sup>th</sup> emergency Board of Directors meeting for the San Lorenzo Valley Water District. The District's Director of Operations, Rick Rogers informed the Board that Cal Fire along with the Valley's local fire departments had too few resources to adequately fight the numerous blazes. In order to concentrate their efforts and protect the lives of the fire fighters, they planned to pull back their efforts to protect downtown Boulder Creek and turn off the water to the outlying residential neighborhoods. Rodgers explained that when buildings burned, the broken water lines could potentially drain the system and they needed that water to fight the fire. The Board's job at that meeting was to grant Rogers permission to work under the direction of Cal Fire in turning off water where needed throughout the outlying town. Boulder Creek's outlying residences were being sacrificed to protect the rest of the Valley.

Rogers, with his signature calm, described these emergency conditions from the Water District office in Boulder Creek as ash rained down and fire trucks drove in laps around the downtown looking for spot fires. In these sobering conditions, the Board voted unanimously to give Rogers the powers to turn off water as directed by Cal Fire.

Fortunately, more fire-fighting help arrived and water flowed to some outlying neighborhoods again. Yet two days later, the next emergency Board meeting brought more bad news. As the wildfire burned the east side of Ben Lomond Mountain, it descended on the Lyon's Water Treatment Plant and facilities which provide 51.5 percent of the San Lorenzo Valley's water.<sup>5</sup> The damage was extensive as Rogers explained to the Board at another emergency meeting on August 21<sup>st</sup>:

"On (Friday,) August 21, 2020 at approximately 02:20 am, Boulder Creek Fire Protection Chief contacted the District's Director of Operations and informed the District that fire had reached the Lyon Water Treatment Plant, Lyon tank, Little Lyon tank, Big Steel Tanks and the Big Steel Booster. The Chief stated that they were doing their best to protect facilities however fire crews were overwhelmed and had to vacate the area. The District was also informed that a large amount of water was lost, running off the facility and down the road."<sup>6</sup>

When the ash finally settled, seven storage tanks, all 7.5 miles of raw water supply lines and transmission water mains between tanks were destroyed. Electrical lines and equipment, communications lines, and equipment vital for operations were also damaged or destroyed. As plastic water lines burned they allowed toxic VOCs into the water system.

VOCs are quite common. When we smell paint or gasoline we smell organic compounds that have a high vapor pressure and therefore a low boiling point, which releases large amounts of molecules into the air.<sup>7</sup> When plastic water lines burn, similar molecule strains enter the water system, including benzene, which is a colorless, sweet smelling but flammable liquid responsible for the odor of gasoline.<sup>8</sup> It's also a carcinogen and was detected in a water sample collected after the fire in the Riverside Grove neighborhood, north of Boulder Creek.

## **State Regulations Ensure Safe and Clean Water**

When water quality issues like this arise, the State Water Resources Control Board (SWRCB) and in particular the Division of Drinking Water (DDW) enters the picture. It was the SWRCB that required the Water District to initiate a “do-not-drink/do-not-boil” order for areas north of the Alba Road/Highway 9 junction that lost water pressure. With the discovery of benzene, the Water District notified the DDW, hand delivered notices to homes within the affected areas in Riverside Grove, and collected more water samples.

Water samples are data points that act like pixels in a photograph. A highly pixelated image lacks the resolution to accurately identify its contents. In the same way, few water samples do not provide enough accurate information to make wise decisions. On the other hand, many samples lend enough clarity to pinpoint water quality issues. Repeating tests increases the resolution and helps determine when the water is safe to drink again. This process takes time, and patience is needed on the part of District customers who must wait for enough test results.

As a result of repeated water testing, many neighborhoods in the upper San Lorenzo Valley were cleared to drink their tap water again. In the areas still contaminated, the Water District will aggressively flush lines, remove service lines to destroyed homes and continue to sample the water.<sup>9</sup> Once the District demonstrates to the SWRCB that the system is intact and water quality samples conform the minimum state standards, then that tap water will be safe to drink again.

However, a new question then arises: what about the next wildfire? Because it’s not a matter of *if*, it’s a matter of *when* the next fire ignites.

## **Forests Need Fires**

Planning for the future begins with understanding both the past and the present. Most of California’s natural ecosystems are adapted to and depend on fire.<sup>10</sup> Many local species such as the Knobcone Pine require fire to open their cones and drop seeds. Our chaparral communities love to burn about every 30 to 40 years on average, which prunes back the Manzanita, Chamise and other shrubs and promotes lush new growth.

Before 1900, low-intensity wildfires often burned across the west. Every year approximately 4.5 million acres burned throughout California.<sup>11</sup> They removed fuel, thinned vegetation, reduced the competition for available water and nutrients, and promoted a resilient, healthy and diverse patchwork of ecosystems that easily resisted drought and insect attacks.

When the First Nations actively burned California’s landscape, they promoted open terrain, which allowed for easier hunting, and timed their prescribed burns to encourage certain food plants to grow.<sup>12</sup> In this way, the people lived as part of the natural landscape, embracing fire as part of their lives. As a result, big trees dotted the countryside interspersed with open areas that grew forage for the abundant wildlife, and diversity – a sign of a healthy landscape – abounded.

Once Europeans settled the continent, they logged the large trees that were resistant to fire and disease and suppressed wildfires, which changed the composition of the forest. The big trees disappeared and younger secondary succession sprouts crowded into the canopy acting as ladders for fire to climb into their crowns. Where once fires burned a particular forest as often as every ten years,<sup>13</sup> now they began to miss these burn

cycles or Fire Return Intervals. When a forest misses enough fire cycles, dead wood collects, fire severity increases and net greenhouse emissions skyrocket, as we experienced in the CZU wildfire.

Now, with each year reporting record-breaking wildfire statistics, California has addressed these problems by committing to allocate over \$1 billion over the next 4-5 years for fire prevention and fuel reduction projects such as prescribed burns and forest thinning.<sup>14</sup> Yet, private landholders own 25 percent of California's forests and do not have the resources to manage them.<sup>15</sup> Many residents of the San Lorenzo Valley are attracted by its verdant forests and affordable housing, and in many cases unknowingly move into a high-risk wildfire zone. In many respects, the SLV is similar to Paradise, CA, with fuel-loaded forests and narrow two-lane roads that cannot realistically evacuate its population in the case of a catastrophic wildfire. All we needed were high winds to have another Camp Fire. We were lucky this time.

Fortunately, the State of California has developed wildfire plans to address the growing concern. The SLV Water District also had wildfire management plans in the works before the CZU Fire hit. With time, as plans are enacted, we can address and get ahead of the potential devastation that fire can generate.

### **After the Fire, There's a Time to Watch and a Time to Work**

As public agencies do their part, we all can learn some immediate dos and don'ts of post-fire responses. The natural reaction after a devastating wildfire like the CZU is to do too much. Safety must come first as we return to neighborhoods with fire damaged trees, toxic ash, unstable slopes, sink holes, utility hazards, road washouts, flooding and displaced wildlife, so addressing these concerns is of primary importance. However, like a cut arm that knows how to heal itself, so too nature can repair itself. It is its own first and best post-fire restoration practice.<sup>16</sup>

As non-deciduous trees suddenly lose all their leaves, this coating of soil protection acts like a scab on a wound. Its mulch absorbs the impact of raindrops and keeps the soil from moving. The native seed bank in the soil will sprout and grow when the conditions are right whereas reseeding will potentially add non-natives to the already stressed environment. Debris in streams and hillsides help to slow the flow of water and cause sediment to deposit, whereas removing log and brush enhances erosion.

So if we don't rake dead leaves, spread seed or haul out debris, what *do* we do? Rich Casale and the Resource Conservation District (RCD) of Santa Cruz recommend the following top ten items to consider when returning home after a fire:

- #10: Get expert help. The RCD offers free site visits to assess individual properties.
- #9: Respect the laws of nature. Let the environment heal itself if it can.
- #8: One size does not fit all. Each property is different and needs different solutions.
- #7: Minimize slope and soil disturbance using a light touch and site-specific tools.
- #6: Look beyond property lines for possible sources of disturbance.
- #5: Protect your property access. Be sure to maintain safe routes in and out of your home.
- #4: Emergency measures are a high risk. It's always best to solve problems before they become emergencies.
- #3: Artificial repairs need maintenance and may eventually need to be removed.
- #2: Consider doing nothing; less may be best.

#1: There's no silver bullet. When it's not safe, it's not safe. Have an emergency plan.<sup>17</sup>

Following these recommendations is a first step in improving our ability to live successfully within the wildland-urban interface. For more information see: <http://rcdsantacruz.org/post-fire>.

## We Need a New Land Ethic

If the CZU fire has one overarching lesson for us it is that we live in changing times. The standard land management practices of yesteryear no longer apply in all cases and in all times, and in fact practices like total fire suppression do more harm than good. In many cases, a mixture of ideas from opposing factions may be the best solution. Fuel reduction such as the prescribed burns of the First Nations may need to blend with intelligent, sustainable timber harvests, roadside fuel clearing, shaded fuel-breaks, mastication of understory fuels, livestock grazing, hardening of structures and limiting residential development in wildfire prone areas. Watershed wide collaboration with multiple land agencies and owners will be essential for a future in which we live with fire instead of suppressing it.

It may turn out that we can balance fire and water into necessary and welcome elements of a healthy environment. We can learn to live with and employ fire as an indispensable tool for a robust forest community as much as we live with and require safe, clean water.

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<sup>1</sup> \_\_\_\_\_. August 2020. *Top 20 Most Destructive California Wildfires*, Cal Fire. [https://www.fire.ca.gov/media/11417/top20\\_destruction.pdf](https://www.fire.ca.gov/media/11417/top20_destruction.pdf)

<sup>2</sup> \_\_\_\_\_. September 9, 2020. *Benzene Detection at Creek Drive in Riverside Grove*. San Lorenzo Valley Water District. Pg. 1. [https://www.slvwd.com/sites/g/files/vyhlf1176/f/uploads/benzene\\_detection\\_at\\_creek\\_dr\\_swrcb\\_approved\\_9.9.2020.pdf](https://www.slvwd.com/sites/g/files/vyhlf1176/f/uploads/benzene_detection_at_creek_dr_swrcb_approved_9.9.2020.pdf)

<sup>3</sup> \_\_\_\_\_. September 3, 2020. *San Lorenzo Valley Water District CZU Lightning Complex Fire Water System and Water Quality Update Public Meeting*. San Lorenzo Valley Water District power point slides, slide #3.

<sup>4</sup> Ibid.

<sup>5</sup> Rodgers, Rick. August 21, 2020. *Memo: Wildland Fire Damage as of Mid-Day August 21, 2020*. Notice of Emergency Meeting Board of Directors, San Lorenzo Valley Water District Meeting Agenda. pg. 2 [https://www.slvwd.com/sites/g/files/vyhlf1176/f/agendas/emergency\\_bod\\_meeting\\_agenda\\_packet\\_w\\_backup\\_8.21.20.pdf](https://www.slvwd.com/sites/g/files/vyhlf1176/f/agendas/emergency_bod_meeting_agenda_packet_w_backup_8.21.20.pdf)

<sup>6</sup> Ibid. pg. 1

<sup>7</sup> \_\_\_\_\_. *Volatile organic compound*. Wikipedia, the free encyclopedia. [https://en.wikipedia.org/wiki/Volatile\\_organic\\_compound](https://en.wikipedia.org/wiki/Volatile_organic_compound)

<sup>8</sup> \_\_\_\_\_. *Benzene*. Wikipedia, the free encyclopedia. <https://en.wikipedia.org/wiki/Benzene>

<sup>9</sup> \_\_\_\_\_. September 9, 2020. *Benzene Detection at Creek Drive in Riverside Grove*. San Lorenzo Valley Water District. Pg. 2.

<sup>10</sup> \_\_\_\_\_. 2020. *Science: Wildfire Impacts*, California Department of Fish and Wildlife. <https://wildlife.ca.gov/Science-Institute/Wildfire-Impacts>

<sup>11</sup> Forest Climate Action Team. 2018. *California Forest Carbon Plan: Managing Our Forest Landscapes in a Changing Climate*. Sacramento, CA. Pg. 13. <https://resources.ca.gov/CNRALegacyFiles/wp-content/uploads/2018/05/California-Forest-Carbon-Plan-Final-Draft-for-Public-Release-May-2018.pdf>

<sup>12</sup> Greenlee, Jason M. and Jean H. Langenheim. April 16, 1990. *Historic Fire Regimes and their Relation to Vegetation Pattern in the Monterey Bay Area of California*. The American Midland Naturalist Journal. Pg. 245. [https://www.researchgate.net/profile/Jason\\_Greenlee/publication/259087535\\_Historic\\_Fire\\_Regimes\\_and\\_Their\\_Relation\\_to\\_Vegetation\\_Patterns\\_in\\_the\\_Monterey\\_Bay\\_Area\\_of\\_California/links/0a85e52e269e683e47000000/Historic-Fire-Regimes-and-Their-Relation-to-Vegetation-Patterns-in-the-Monterey-Bay-Area-of-California.pdf](https://www.researchgate.net/profile/Jason_Greenlee/publication/259087535_Historic_Fire_Regimes_and_Their_Relation_to_Vegetation_Patterns_in_the_Monterey_Bay_Area_of_California/links/0a85e52e269e683e47000000/Historic-Fire-Regimes-and-Their-Relation-to-Vegetation-Patterns-in-the-Monterey-Bay-Area-of-California.pdf)

<sup>13</sup> Forest Climate Action Team. 2018. *California Forest Carbon Plan: Managing Our Forest Landscapes in a Changing Climate*. Sacramento, CA. Pg. 14.

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<sup>14</sup> \_\_\_\_\_. April 12, 2019. *Wildfires and Climate Change: California's Energy Future*. A report from Governor Newsom's strike force. Pg. 8. <https://www.gov.ca.gov/wp-content/uploads/2019/04/Wildfires-and-Climate-Change-California's-Energy-Future.pdf>

<sup>15</sup> Ibid. Pg. 9.

<sup>16</sup> Casale, Rich. 9/12/20. *Post Fire Restoration: What Works and What's a Waste of Time*. Resource Conservation District of Santa Cruz webinar. <http://www.rcdsantacruz.org/post-fire>

<sup>17</sup> Ibid.