

HOPE RISES AMIDST ASHES OF ARAPAHOE FIRE

The soil microbes went back to work and with a little help are engineering a newborn landscape



Wildfires are a natural part of forest and prairie ecosystems. Many native species that grow in these areas respond well to fire, some even require the heat to allow seeds to be released from pods.

Heat from a wildfire can also be beneficial in breaking pest and disease cycles within forests and prairies. Fires speed up the decomposition process, chemically releasing nutrients that would otherwise be tied up in dead plant material for significantly longer periods of time; however, this knowledge doesn't make it any easier when a community suffers from blazes that leave little but black soot behind them.

Although homes, livelihoods, and views are dramatically altered, there is hope. Life still functions beneath the dismal, blackened surface. Soil microorganisms such as bacteria, fungi, algae, and protozoa, are hard at work repairing the functionality of the system, quite literally from the ground up. These microscopic engineers build soil and feed plants. In healthy soil there are more microorganisms in a tablespoonful than there are people on earth!

Fire does decrease their numbers, especially after a more intense, longer duration fire; however, the activity of the

remaining microbes soon increases to levels greater than before the fire, which means the remaining microbes are working harder after a fire than the entire microbe population did prior to the event. This is known by measuring the metabolic activity of microorganisms (by measuring the amount of certain gases they produce prior to and following a fire).

Helping microorganisms

The land will improve faster if we as land managers can aid these microbes in getting their job done. You might be thinking, "What can I do to help these microscopic soil organisms?"

The Natural Resources Conservation Service (NRCS), a USDA agency founded on soils and soil health, has some suggestions.

In 2012, the Arapahoe Fire ravaged more than 98,000 acres in the Laramie Range spanning Platte and Albany counties. The NRCS worked with several landowners and agricultural producers over a three-year period to implement practices that helped the land recover. The methods encouraged natural function and native species regeneration.

First and foremost, but likely the hardest to accept for a livestock

operation, is to defer grazing on the burned areas for two growing seasons following fire. We often see a flush of green following a fire event. Animals that consume grass (livestock and wildlife like elk) are very attracted to this new growth, but we have to remember the stress these plants endured. The plants are using what's left of the nutrients stored in their roots to generate growth enough to reproduce. Animals grazing these plants are further depleting their stored nutrients and decreasing their chances to reproduce.

The fires we've been witnessing lately are burning in areas that haven't seen a fire within the natural fire cycle timeframe. This means there's a lot of debris to burn, causing the fire to sit in one place for a longer period of time, burning pretty hot. There's usually less nutrients left available for plants after higher intensity fires.

By allowing native plants two full growing seasons with limited stress (such as grazing and weed pressure), they have the opportunity to work with the soil microbes to reproduce and fill in the landscape.

Likewise, if you're a smaller acreage landowner and don't have livestock that graze, you still need to refrain from mowing the grass until after the plants drop their seed. The place might start looking a bit scruffy toward fall, but there will be time to prune things a bit before winter. Who doesn't like a good excuse not to mow the grass!

« The lightning-caused Arapahoe Fire burned nearly 100,000 acres of the Laramie Mountains near Laramie Peak in 2012. The wildfire, which occurred during an extreme drought, consumed most of the vegetation in the area, including ponderosa pine and shrubs. It started on June 27, and was declared "contained" on August 23 (National Interagency Fire Center, 2012). (Photo by Andrew Rose)



Looking northwest in the north Laramie Mountains toward prominent Laramie Peak. (Photo by Steve Williams)

Several ranchers after the Arapahoe Fire took the initiative to evaluate their grazing opportunities. Some moved cattle to leased ground, others shifted winter and calving pastures to other areas of the ranch. NRCS worked with them to ensure the alternate acres wouldn't suffer from the change or increase in use.

This somewhat forcible change in use has come to benefit operations over the long-run. They have found the flexibility in their operations, which gives them more opportunity in their business decisions.

There will be bad with the good

Erosion and the onset of weeds are the two most looming concerns following a fire. We've already taken first steps to reduce erosion by allowing the plants time to grow roots that hold the soil in place. The root systems are also providing added nourishment to the soil microbes, which are working to improve the soil structure. More often than not fires occur late in the season, and plants don't have enough time to make much of a difference. When it comes to erosion, rain and strong winds can move a significant amount of soil in a short amount of time. If feasible, erosion control measures can be taken.

There's not much plant canopy left after a fire. This leaves an opportunity for new plants to grow. Unfortunately, invasive plant species are able to utilize the flush of nutrients left behind by a fire to reproduce quickly and promptly colonize, which is why we often see weed species explode after a burn event.

Undesirable species present before the fire will likely return after the fire in great numbers. In these areas of concern there is an exception to the grazing rule. Allowing livestock to graze during the flush of green immediately after a fire, for a short duration, has been shown to decrease the number of weeds returning the following year.

Keep in mind a long rest from grazing is key to replenishing native grasses. Addressing additional weed issues early in the spring following a fire is important. Working with your local weed and pest district and monitoring the site closely is recommended.

Good old patience is the final piece of the puzzle. Mother Nature and our little soil engineers need time to regenerate the biomass that was lost. Luckily, 2013 brought decent moisture, which the native grasses responded to very well. What were black, barren waste lands just 10 months earlier were now covered with grass 4-foot and 6-foot high!

Landowners were also pleasantly surprised by some benefits to the change in their landscapes. An area that had been mainly a sagebrush monoculture was now filling in with native grasses. An area cattle used to avoid would now provide additional feed. These successes came by allowing the natural processes of the ecosystem time to work.

Although the landscape will likely not return to what it was in our lifetime, with a little planning and patience the ground will be a healthy, functioning system sooner than you think!



This 2015 photo shows grasses and forbs that reestablished within three years of the fire. Also present is the noxious weed, Canada thistle. (Photo by Steve Williams)

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Not a landowner, or haven't been affected by a fire but want to help?

The National Forest Foundation will plant a tree for every \$1 donated! Donations can be made at bit.ly/donateplanttrees.