

We submit these comments on behalf of Utah Physicians for a Healthy Environment (UPHE), and Doctors and Scientists Against Wood Smoke Pollution (DSAWSP). UPHE is one of the largest civic organizations of healthcare professionals in the Western US, and specializes in the medical research on air pollution's harm to public health. DSAWSP is an international coalition of experts on the public health, environmental, and climate consequences of wood combustion.

While we are not forest ecologists, we are closely networked with other organizations that have that expertise.

We oppose the Big Cottonwood Canyon Project for the reasons outlined below

1. Specific Objections to the Environmental Assessment of the Big Cottonwood Canyon (BBC) Project

We dispute the Emergency Action Determination by the Forest Service that allows a waiver of pre-decisional administrative review. That determination should require some degree of objective, empirical evidence, studies of comparable circumstances rather than just subjective justification on the basis of the “recent low snow pack and the vague, poorly defined, and unsupported claim of “heavy fuel loading.” **If objective information is available to make such a determination, justifying such extreme and costly measures, then the agency should be taking other action to reflect that emergency, such as limiting recreation and other human activity in the same area given that humans cause the overwhelming majority of wildfires.** For example, the agency should be lobbying the state to be more proactive on other control measures to reduce forest fires, such as prohibit the sale or possession of fireworks because it is impossible to control where they are used once purchased. The state could do much more to prohibit target shooting, another common cause of wildfires.

If there is indeed an “emergency” fire risk justifying reducing public input the way the agency has done in this case, then the response should be focusing on forest home protection, the technique of “home hardening and creating defensible space,” not giving home owners the false promise that landscape scale forest thinning will protect them.

The Forest Service states that the purpose and need of the project is to, “better protect the BCC watershed; reduce risk to public health, safety, and infrastructure that is at risk of impacts from uncharacteristically severe wildfire; address insect and disease outbreaks, and declining forest conditions,” and that vegetation in BCC and its tributary watersheds have grown into a condition that is highly susceptible to intense, fast-moving, and difficult-to-control wildfires and has declining forest health.” Yet nowhere in the documents available to the public is there any evidence to support these highly subjective claims.

The agency claims areas of this project are unnaturally dense, apparently insinuating that it is due to overly aggressive forest replanting decades ago, and/or to decades of fire suppression. One could challenge that assertion in that there is no such thing as an “unnaturally dense forest.” In undisturbed forests, seedlings may sprout in concentrated patches, but survival and growth will ultimately be determined by the growth conditions allowed by the natural environment.

The Forest Service invokes an infestation of the Balsam Woolly Adelgids insect as a reason for the project. Yet the EA also says that subalpine fir are the species most susceptible and says this species is essentially already being eliminated from the area because of the infestation.

We are not aware of any evidence, and we see none in the EA, that thinning live trees, removing dead trees or understory, reduces or limits the spread of the insect or tree mortality. Bark beetle infestations have been the target of more research, but there is also no evidence that controlling beetle infestations is possible by removing infected trees.

In the case of beetles, they complete their life cycle and disperse before trees show visible mortality, so by the time a tree is identified for removal, the beetles are already gone. Logging the dead trees does not remove the beetle population. Equipment moving through stands, slash piles, and wounding of residual live trees can actually increase stress on adjacent trees and make them more susceptible to a variety of insect attacks. The most comprehensive review of bark beetle management strategies found that salvage of beetle-killed timber has no demonstrated effect on population-level beetle dynamics. Outbreaks are driven by stress from drought and temperature — neither of which logging addresses. If anything, logging exasperate. Leaving the forest alone is not just an option, it frequently produces a better ecological outcome.

The Forest Service claims the project would not “significantly affect the quality of the human environment, either individually or within the reasonably foreseeable future.” Again, there is no definition of the vague term “human environment” and no evidence is provided to support this highly subjective claim.

The Forest Service defines the ecosystem of Big Cottonwood Canyon as a “fire-dependent” ecosystem. It is unclear what the agency means by that, but the term is usually used in reference to plants that require fire to reproduce. The dominant trees of the canyon, Douglas Fir, Subalpine Fir and Englemann Spruce, do not require fire to reproduce, but experience natural fire intervals of 150 to 300 years, and historically those fires have been high intensity which has led to aspen regeneration. What the agency intends to recreate is not that, in fact that’s what the agency is attempting to prevent.

If “natural” circumstances can be equated with “healthy,” to use the agency’s terminology, then it would seem that rare but intense fires are required for a healthy Big Cottonwood Canyon forest. While it is not practical to allow intense fires when homes, property and vital watershed are at stake, the logging and pre-scribed burns of

this proposal will not create any more of a natural setting than what currently exists, nor will they simulate the historical fire pattern of the canyon.

The fuel reduction activity the agency claims will reduce “threat to human safety, the public, and private property and infrastructure, recreation areas, ecosystems, and the water supply for the Salt Lake Valley” is itself also threat to all of those same entities. It claims that this project will “reduce long term risk to public health,” based on poorly supported assumptions. Meanwhile, these activities are a direct and demonstrable hazard to public health as will be elaborated on later in these comments.

The EA claims, “Reduced fire intensity would lead to lower crown scorch and decreased tree mortality in the event of a wildfire. In general, fire rates of spread would decrease as treatments disrupt fuel continuity and decrease tree torching and spotting potential.” The chance of a wildfire encountering a "prescribed burn" area within a time frame that it acts to attenuate a future wildfire is small. One study found only about 1% of Forest Service treatment areas experience wildfire each year, on average. The effectiveness of forest treatments lasts at most 10–20 years, suggesting most treatments have little influence on wildfire.

So, a completely unrealistic amount of prescribed burn acreage and frequency have to take place or those odds dramatically reduce the value of the entire strategy. The Forest Service is causing a lot of guaranteed of harm to achieve about a 4% chance of uncertain benefit. That is extremely poor and inappropriate risk management.

In several places the EA mentions a supposed value of “opening up the canopy to more sunlight.” Yet that will certainly exacerbate other characteristics that will increase fire risk, i.e. warm forest temperatures, decrease moisture, and increase wind. In fact, the EA admits that, “in some areas rates of spread may slightly increase due to grass, herbaceous and other fine fuel growth under more open forest canopies.”

The research on whether ladder fuels increase fire risk seems contradictory. Even research that shows the presence of “ladder fuels” is associated with increased wildfire severity, also found that canopy volumes were not. That clearly disputes the claim that opening up the canopy is associated with decreased risk of severity.

2. Most “Fuels Reduction” Projects are Forest and Wildfire Malpractice

UPHE is one of at least 60 environmental groups throughout the country that dispute the basic premise that drives the Forest Service’s insistence on “fuels reduction” projects.

Likewise, the agency's claims of benefits from this project rest on evidence that is contradicted by independent research. The research used to justify the narrative that our forests need thinning throughout the Western US is clouded by conflict of interest. It operates under the umbrella of the US Dept. of Agriculture, which treats forests as a commodity resource. Consider this parallel. If the FDA received revenue from Prozac sales, published their own research or that of the manufacturer showing its efficacy, and heavily promoted Prozac, the conflict of interest would be obvious. Within the medical community that conflict of interest would appropriately taint the conclusions of the research.

There is no reason the Forest Service's research should be treated differently. The agency's mandate includes acting as a facilitator for the logging industry, and historically it has consistently played that role. It promotes lumber and wood products with videos like [this](#), that encourage burning wood for heat, the most polluting way possible to heat a home (and more carbon intensive than using coal), while simultaneously claiming thinning creates healthier forests. The agency receives some of its funding selling trees to the timber industry. This obvious conflict of interest is institutionalized, and warrants suspicion towards agency research that finds active management, especially commercializing forests, makes them healthier. If agency sponsored research is untainted and scientifically valid, it should at least generally agree with independent research. That is not the case.

Forest Service studies claiming fire suppression has left current forests much more dense than historical densities have been heavily criticized by independent researchers. While there may be an overall a comparative increase in the number of small trees, there are fewer large trees, and less total biomass due to decades of logging, and therefore less carbon and less biomass stored in most of our forests than they would otherwise naturally have.

The agency claims that thinning to mimic historic density allows remaining trees to survive drought better because they have less competition for sunlight, moisture, and soil nutrients. Other research shows it's far from that simple. Canadian researchers found that the benefits of thinning were limited to "a few insects and pathogens," and there were negative effects on "root rot severity." The authors stated, "...it is difficult to draw general conclusions from the literature about the potential of thinning to increase the overall resistance and resilience of forests to global change," and that "thinning should not be promoted as a tool that will universally increase forest resistance and resilience."

At least two studies found there is no benefit to remaining tree survival in drought circumstances with up to 30% thinning. Only with intense thinning, 40% or greater is benefit is realized. We could find nowhere in the agency's EA that specified what percentage of thinning it is pursuing. If indeed it pursues 40% or more thinning that would completely transform the canyon landscape and cause numerous other harms.

Another study showed that the death of a tree can enhance or suppress the growth trajectory of a neighboring tree depending on the size of the neighbor and the species. In other parts of the world thinning forests decreases

tree species diversity, and decades later thinned forests still have decreased stem density and basal area.

The very best that can be said is that under some circumstances, thinning may decrease one stressor associated with tree mortality, i.e. competition for water, but at the same time increase other stressors; wind, forest temperature, and drop in humidity.

Furthermore, any research that shows the efficacy and safety of forest thinning has not been done in the backdrop of rapidly accelerating global temperatures. Unintended and counterproductive consequences that cannot be predicated based on an historical climate pattern, are possible, if not likely. Those consequences are likely to compromise regeneration and convert forested areas to non-forest areas.

The Forest Service invokes outdated and unscientific assumptions that dead trees only act as “additional fuel loads” and increase the severity of fire and therefore removing them should be part of the wildfire mitigation strategy. Dead trees serve multiple important ecological functions. For example, in a study of downed logs on a dry forest site in the Siskiyou National Forest that had no precipitation for 77 days before a high-intensity wildfire, so much water was discovered in the interior of sampled logs that the researchers could literally wring the water out of the wood. These water mini reservoirs allow the establishment of native plants following fire, and maintain adjacent vegetation during drought periods. Removing large snags and logs eliminates these microhabitats on uplands and can adversely affect water quality and aquatic habitats.

When high-intensity fires consume tree crowns, the residual shade provided by large-diameter snags and logs can be vital for retaining soil moisture for vulnerable tree seedlings, and for moderating temperature increases in streams for sensitive fish species.

Large-diameter snags and logs have naturally low flammability, and there is no evidence that forests with dead trees experience increased fire severity, or that salvage logging reduces fire severity. Insect killed trees are more likely to buffer rather than exacerbate fire severity. In general dead trees left standing can actually reduce wildfire severity.

Firebreaks are of limited or no value in extreme conditions

This stated purpose and need of this project is to reduce “uncharacteristic” fire behavior; presumably severe or intense fires. But in those circumstances, high wind is invariably a dominant factor, and in that setting, firebrands easily travel much further than the width of fire breaks, something that is often inadequately represented in fire simulation models.

Therefore, in the very situation that this project is ostensibly intended to address, a pillar of the strategy behind this project, “fire breaks,” are of limited value and may be entirely useless.

Emerging research shows logging damages remaining trees, and does not “restore” forest health. Through underground mazes of roots, fungi, and bacteria called “mycorrhizal networks,” trees share resources like water and nutrients, helping each other survive stresses. Forest thinning may reduce competition for water and sunlight and initially allow more growth, but it also heats up and dries out the forest floor, and disrupts these mycorrhizal networks leaving remaining trees more vulnerable to disease, pest attack, wind, and drought, shortening their life span. In particular when the largest, oldest trees are cut down, it diminishes the survival rate of younger trees.

The extent and interconnectedness of root systems was illustrated by the largest, most destructive wildfire in New Mexico’s history, the April, 2022 Calf Canyon fire that burned 341,471 acres and lasted five months. It started when slash piles burned in January of that year by the Forest Service had not been fully extinguished, and months later, in a dry spring, strong winds reignited them. Fire had spread underground along tree roots eventually reaching the surface and ignited when winds fanned the flames.

A Forest Service review of the Calf Canyon disaster drew three conclusions among others, identifying exactly what independent research has demonstrated:

1. “Execution of the mechanical thinning prescription resulted in an open canopy that increased the amount of solar radiation and in-turn increased the rate of snowpack sublimation and snowmelt. In addition, the open canopy may have increased post-thinning windthrow that increased surface fuel loading significantly between thinning and pile burning treatments.
2. Climate changes have narrowed the window for “safe” prescribed and slash pile burning, meaning there is a highly likelihood of those piles not being burned in time to avoid disaster.
3. Converting live trees to dead trees by cutting them down increases their ignition risk.



Photo of smoke from the Calf Canyon fire in New Mexico.

In other words, if slash piles are constructed, but for whatever reason cannot be ignited during a narrow window of suitability, then during the time those piles stay on the forest floor unburned, they represent added risks for wildfires that would not have been there otherwise.

The agency claims that prescribed burns only become uncontained wildfires less than 1% of the time. But the Calf Canyon fire is a tragic example of the massive destruction that can occur when that happens, yet these outcomes don't seem to be appropriately factored into their risk/benefit assessments.

Heavy equipment often damages trees that are left after a "thinning." Trees within 10.5 m, are at particular risk for collateral damage and mortality.

The most widely cited forest ecologist in the world, [Dr. David Lindenmayer](#), author of 48 books on forests, says, "[logged forests always burn at greater severity than intact forests.](#)" The climate crisis has become [the main driver](#) of Western forests' new fire vulnerability. Fire frequency, intensity, speed, and ultimate scale of destruction are directly related to persistent drought, abnormally high temperatures, wind penetration, and

human activity, not tree density or “excessive fuels.” Two of those factors are primarily climate related, and forest thinning increases all four on a local level.

Beyond that, daily fire weather (therefore climate) is the most important predictor of fire severity, followed by the age of the forest (older forests are less vulnerable). Industrial plantation forestry, with spatially homogenized trees is also associated with increased fire severity, but pre-fire forest biomass is not an important predictor.

Forest management like prescribed burns and thinning, often require road building and skid trails leaving lasting ecosystem damage: soil compaction, surface erosion, increased stream sedimentation, degraded water quality and aquatic habitat, reduced biodiversity, spread of invasive vegetation, and suppression of forest regeneration. Over 89% of forest fires are human caused, and invariably, an increase in human presence in the forest, means ultimately more fires.

Even if this project does not involve new road building per se, the presence of crews with heavy equipment will have somewhat the same effect.

Furthermore, it is usually human-ignited fires that start in or near populated areas. Of human caused wildfires, 95% occur within half a mile of a road. Only 3% start in wilderness, backcountry areas. Over 53% more wildfires occur within 200-meters of a road than would be predicted by a random distribution. Nor do roads serve as effective fire breaks.

The most destructive fires are those that spread abnormally rapidly. Thinning and prescribed burns further open the door for invasive grasses, like cheat grass, which is highly flammable but also fire tolerant. The authors of a recent study stated:

“It is also known that invasive grasses can drive increases in size, occurrence, and frequency. Because grass-fueled fires are some of the fastest, it may follow that fire speed may have also increased where vegetation transitions have occurred, for example, from forest or shrubland to invasive grassland.”

In the US, six different invasive grasses have been tied to a 150% increase in fire frequency compared to uninvaded areas. One invasive grass now spreading in Oregon, *Ventenata*, has created fuel loads 50 times greater than in areas free of the species

A long list of other research that found “fuels treatments” like thinning and prescribed burns do not decrease wildfire severity and risks can be found here.

Forest trees provide the same benefits as urban trees, such as stabilizing local climate by [transferring heat](#) from land surfaces to higher in the atmosphere and buffering temperature extremes. On a global scale, forests reduce earth's temperature about [0.5 degrees C](#). Trees release water vapor and biogenic volatile organic compounds (BVOCs) which [promotes cloud formation](#), and [contributes further](#) to cooling and formation of condensation nuclei, more cloud formation, and ultimately precipitation. Thinning the trees of Big Cottonwood Canyon can be expected to leave the same consequence on the microclimate of the canyon.

The Forest Service claims vague evils of conifers invading aspen, and vague virtues of removing conifers to allow more aspen. The EA should explain more about what value that represents because that trend could be interpreted as simply an evolutionary inevitability.

A [recent study](#) is cited inappropriately as justification for prescribed burns in the Western United States. Kelp et al. (2025) found no significant reduction in wildfire severity from thinning, but did find a significant reduction in fire severity from prescribed fire conducted less than two years prior to wildfire. The study also reported substantial reductions in particulate emissions from prescribed fire. However, on page 10 of that study, the authors base their results regarding particulate emissions reduction on the assumption that "on average 75% of the land treated by Rx [prescribed] fire burns in a wildfire within the next 8 years", which the authors say "agrees well with encounter rates for Northern California (Beidler et al., 2024)." However, only a small portion of one Western state, California, had an encounter rate (prescribed fire area later burned in wildfire) anywhere near this high, and that tiny portion of the western U.S. was a profound outlier. [Beidler et al.](#) (2024) reported, in Table S8 (Supplemental Information Table S8), that even over the course of 10 years the encounter rate in western US states ranged from 7% to 17%, not 75%. Therefore, the particulate emissions reduction results reported by Kelp are not applicable to the vast majority of areas in the western U.S., either because wildfires mostly do not encounter previous prescribed burn units within a given decade, or because prescribed fire would have to be conducted far more often--unrealistically often--to achieve a higher encounter rate.

3. The Project is Climate Malpractice.

The climate crisis was called the greatest threat to global public health by [more than 200 medical journals](#) in 2021. It is also well understood that if there is still a window for averting an accelerating climate disaster in future decades, triggered by multiple irreversible tipping points, that [window is very short](#), now only [about five years](#) at the most.

The science and empirical evidence behind the global warming/climate crisis are indisputable. Last year was globally [the third hottest year ever](#) despite the cooling effect of La Nina which typically causes temperatures to drop. The year before, 2024, was the hottest year in recorded history, and the past ten year span has been [the](#)

hottest decade ever. Warnings from climate scientists are increasingly dire. The World Meteorological Organization's State of the Climate 2024 Update, released in Nov. 2024, once again issues a Red Alert:

...at the sheer pace of climate change in a single generation, turbo-charged by ever-increasing greenhouse gas levels in the atmosphere. 2015-2024 will be the warmest ten years on record; the loss of ice from glaciers, sea-level rise and ocean heating are accelerating; and extreme weather is wreaking havoc on communities and economies across the world.”

More evidence that the world is barreling towards tipping points that would mean catastrophic and irreversible climate change was published recently with scientists finding a blob of cold water in the North Atlantic, best explained by weakening of the Atlantic Meridional Overturning Circulation, which would cause major climate disruptions, especially in Europe.

The climate crisis, bringing increased temperatures, drought, and declining snow pack, is also the dominant threat to our forests, including in the Wasatch Mountains. And that threat will grow even more so in the future. Any policy however well-intended or otherwise meritorious, is irrational and a betrayal of humanity across the globe unless it prioritizes above all else, its impact on climate, especially the short-term impact.

That means, for example, even policies intended to improve certain wildlife or vegetative habitat, but require forest thinning, must be suspended if they also worsen the short-term atmospheric carbon equation. For virtually any public policy that impacts our climate, those climate consequences must be given priority, especially those with immediate impact on atmospheric carbon concentrations.

Thinning and prescribed burns under the premise of wildfire reduction or control are not just misguided but are counterproductive. Fuel reduction forest management is associated with high forest carbon storage losses. Forest thinning and prescribed burns exacerbate the climate crisis directly and immediately in two ways. One, the carbon absorption by trees and vegetation is immediately ended when they are cut down. Two, burning, as with prescribed burning or pile burning, immediately releases that carbon into the atmosphere. These projects result in a net tree mortality—i.e., they kill more trees and carbon storage vegetation than they prevent from being killed, and therefore they only add to the climate crisis, and at the worst possible time.

Any argument that forest thinning is so effective in reducing wildfire carbon emissions that it more than offsets the two factors mentioned above is completely lacking in supportive evidence.

Even Forest Service researchers acknowledge that “wildfire reduction strategies reduce carbon sequestration potential in the near term, but provide long term benefit.” But as we pointed out above, policies that negatively affect climate on the short term, must be suspended, even if they have the potential for benefit decades later.

Replacement trees obviously cannot grow fast enough in any meaningful time frame for their carbon absorption to offset the carbon released from burning them.

4. The Project is Public Health Malpractice—Air Pollution

Physicians at UPHE specialize in air pollution and its health effects. We strongly object to the cavalier dismissal of public health impacts from this project.

Air pollution kills people. Researchers estimate that up to 8,000 people die in Utah every year because of the various sources of air pollution in the state. Air pollution also causes or exacerbates a list of chronic adult diseases and poor pregnancy outcomes as long as those caused by smoking cigarettes, which is a similar source of air pollution.

There is a dictum in the medical community that may be the first principle of physician practices, “First do no harm.”

We find no parallel in the practice of medicine that comes close to the poor risk management and harm inherent in this project. To us it seems as nonsensical and extreme as recommending random 20 year-old patients undergo chemotherapy, radiation therapy, and multiple organ removals on the possibility of getting cancer some day in the future.

As we write this, the Salt Lake Valley is recovering from a brush fire in the foothills that eventually reached about 500 acres. The smoke was causing significant symptoms among people who were more than 10 miles away. Air quality readings on surrounding purple air monitors reached over 100. The agency’s EA says that burns will generally be limited to about 300 acres a day, in “1,600 acres units,” and that the total amount of landscape prescribed burns will be up to 11,794 acres. Given the experience of residents of the East side of the Salt Lake Valley this weekend, that is terrifying.

Putting that further in context is the experience of residents of Helena, MT two months ago from a Forest Service prescribed burn. On April 9 of this year, the agency conducted a prescribed burn on 330 acres near Helena, MT. By 9:00 pm, the nearest PM2.5 monitors at about 2.5 miles away read a shocking and highly dangerous 732 ug/m³. The air pollution remained significantly elevated until noon the next day.

PM2.5 levels that high (and they would have been even higher closer to the burn plot) indicate a severe, immediate, and deadly concentration of air pollution, capable of causing heart attacks, strokes, and sudden death from a variety of causes, including still births. Similar impacts would have been inflicted on wildlife. It would be consistent with thousands of studies on air pollution if there were otherwise unexplained fatalities in Helena for the next 1-2 months beginning on the evening of April 9.



Smoke from the prescribed burn near Helena on April 9, 2026

Obviously, the public in Helena was in extreme danger from the smoke from the prescribed burn. Despite all the planning and approvals from the relevant state agencies, the Forest Service put the entire town of Helena in a life-threatening situation. Whatever the goals of the intentional burn, they could not have justified the outcome. When I communicated with the director that ordered the burn, Emily Platt, she responded that “the forecasted winds were expected to be stronger overnight” as the only explanation or excuse for the outcome. But she went on to downplay the extreme pollution as “an unavoidable reality of any prescribed fire.”

The agency’s EA on the BCC project is similarly dismissive. The agency states in the EA that “temporary smoke production and minor air quality degradation may result from prescribed burn activity.” Beyond that the agency only points to a “burn plan” as a reason to claim the public will be protected from harm. On page 11 of

the EA there is a list of state agencies and other entities that were “consulted ” in developing this proposal. But there is no entity on that list that remotely represents any public health expertise. Certainly, there is no entity listed that specializes in the health consequences of air pollution.

The agency does a profound disservice to the public by broadcasting a perfunctory grasp of the human health consequences of their actions and a tunnel vision with regard to the collateral damage of their seemingly predetermined choice.

While air pollution events from prescribed and pile burning may be short-lived, the health consequences are often not. Decades ago, the EPA recognized this which resulted in two different air quality standards, one for 24 hours and another for annual average. Acute exposure to air pollution from any source can have a wide variety of health consequences from trivial to lethal. Because the physiologic response to the exposure (to simplify, a nearly immediate release of inflammatory chemicals) only dissipates slowly, the health consequences can persist long after the exposure ends. That’s why on intense events, like the one in Helena, exposing a large number of people results in an epidemiologic footprint (like increased mortality) that does not return to normal for weeks or even months later. So, the Forest Service should not attempt to placate the public that its pollution from intentional burns can in any way be dismissed as short-lived.

This is also true of fetal exposure to short term pollution events (days or weeks) because the impact can have life-long consequences to the integrity of any and all critical organ development.

For multiple reasons wood smoke from any source is the most toxic type of air pollution the average person ever inhales, whether it comes from a fireplace, wood or pellet stove, wildfire, or a prescribed burn. Beyond greenhouse gases, burning biomass emits pollution gases like sulfur dioxide (SO₂) and ammonia (NH₃), ozone precursors nitrogen oxides (NO_x), volatile organic compounds (VOCs), and both filterable and condensable particulate matter, primarily smaller than 2.5 µm, and an array of many of the most toxic chemicals known, including dioxins, furans, and dioxin-like polychlorinated biphenyls, benzene, polycyclic aromatic hydrocarbons (PAHs), formaldehyde, and acrolein.

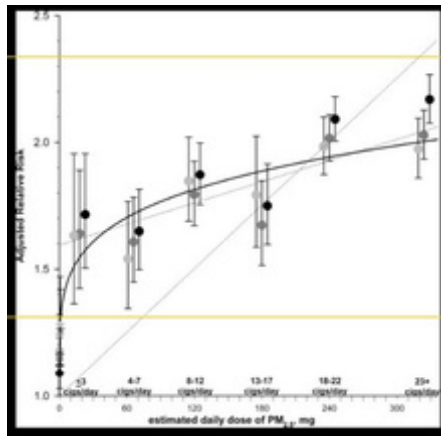
In total, on a national, epidemiologic scale, emissions from prescribed burns are just as damaging to human health as those from wildfires. A recent study concluded that annually, nationwide, wildfire smoke and prescribed burns combined to cause the deaths of 20,000 Americans a year, and slightly more than half of those deaths were caused by prescribed burns. Another study, published in one of the most prestigious medical journals in the world, was even more stark. It found that **per hectare burned, the overall health burden and daily health care costs was nearly five times higher for prescribed burn smoke compared to wildfire smoke. This contradicts claims that human health is being protected by prescribed burns.**

A review article of research on characteristics of biomass burning emissions establishes several important factors on the issue of whether or not the more intense wildfires that prescribed burns are supposed to prevent, are in fact more harmful to human health. It is not just the amount of particulate pollution being emitted, many factors influence toxicity of biomass burning emissions: the size and shape of the particles, their chemical composition, the age of the particles in the atmosphere, and the type and species of biomass being burned. In turn, many factors influence those characteristics, such as the intensity or temperature of the burn, the amount of oxygen in the flame, combustion efficiency, and the progression phase of the burn, i.e. flame or smoldering.

The review found that very intense fires, as opposed to lower-intensity burns like prescribed burns, had higher concentrations of incomplete combustion, and created larger particles. Particle size is extremely important in assessing toxicity of the particles. Smaller particles are more easily inhaled, more difficult to exhale, more easily picked up by the blood stream in the lungs, and then more easily penetrate organs, tissues, and individual cell membranes once those particles are distributed systemically in the blood stream. Moreover, the smaller the particle the greater the surface area for an equal amount of particle mass. The greater surface area allows more toxic chemicals and heavy particles to be adsorbed on to the particle and greater chemical surface reactivity with body molecules. The smallest particles trigger the most oxidative stress, inflammation, tissue injury, and DNA damage.

Fire temperatures and severity are not directly proportional to health hazard. Although inhaled particulate matter of any size can cause health problems, in general, the smaller the particles the more damage they can do compared to an equal amount of particle mass consisting of larger particles. **On that basis alone, the larger particles of more intense wildfires are less toxic than smaller particles typical of prescribed burns.** Other studies have shown that per ton of biomass burned, low intensity burns produce more smoke emissions than higher intensity burns.

It is well known by every relevant medical organization and governmental regulatory agency in the world, there is no safe level of air pollution, it is harmful at even very low concentrations. Furthermore, it is also well known that the dose response curve between air pollution concentration and adverse health outcomes is not linear, but hyperbolic, i.e. steepest at the lowest concentrations. Every critical organ system can be harmed by air pollution, including every cell in the body.



Peters, A. Air Quality and Cardiovascular Health:

Smoke and Pollution Matter. *Circulation*. 2009:

120:924-927

Hyperbolic, air pollution dose response curve. This graph demonstrates there is no safe level of particulate pollution, and that the relationship between dose exposure and disease is the strongest at the lowest doses.

This means that even small increases in exposure to communities in rural areas is harmful to their health, and that includes from prescribed burns and slash pile burning from forest thinning.

The residual ash from thousands of slash pile bonfires are essentially unlined, unregulated, mini-superfund sites, loaded with highly toxic concentrations of PAHs, PFAS, dioxins, furans, and heavy metals, which can eventually make their way into the watershed and ultimately the water. There is no shortage of irony that part of the reason for justifying this project is to protect the integrity of the watershed.

We are also concerned for the health of Forest Service workers or contractors exposed to the smoke on a regular basis. We see videos and pictures of employees engaged in burn projects, and we seldom if ever, see any of them wearing any respiratory protection. It is abuse of these workers to not thoroughly inform them of the personal health risks of being around fire constantly without respiratory filters, and the need to faithfully wash their clothes daily because they can adsorb through their skin, significant amounts of chemical pollution from the smoke, including clothes that have been saturated with smoke.

It is hard to justify what we fear will be routine smoke pouring down Big Cottonwood Canyon into the broader residential area of the East side of the Salt Lake Valley, especially at night, during the fall and spring for the next ten years. To endure that in exchange for a small chance at intercepting a wildfire is upside down risk management.

6. The Project is Public Health Malpractice—Herbicides and PFAS

Forest managers often use massive amounts of herbicides as part of their “fuels reduction” projects, even extolling it as an “integral part” of modern forestry practice because they claim it increases forest wood volume and even biodiversity. This particular project is also paired with widespread herbicide use which should be absolutely prohibited given that Big Cottonwood Canyon is responsible for 40% of Salt Lake City’s culinary water.

Ten years after their use, herbicides (typically glyphosate, i.e. Roundup) can still be shown to reduce plant species diversity in the understory. But the human health impacts are far more alarming, and are usually dismissed or completely misunderstood by those who make decisions on their use in forestry. In the EA we could find no acknowledgement whatsoever of any consequences to herbicide use.

As biologic poisons, pesticides (herbicides and insecticides) have always been recognized as a hazard to human health, and their use has been controversial since at least 1962 with the publishing of Rachel Carson’s *Silent Spring*. The idea that widely distributing biological poisons would leave beneficial plants, animals, and humans unharmed never made scientific sense, and in recent decades, a growing body of research confirms they do damage to far more of the biological world than just pests. But now the danger of the use of pesticides is likely exponentially greater.

A second dimension of concern emerged in the 1990s with research that showed many pesticides (including the most commonly used herbicides containing glyphosate) were also endocrine disruptors, i.e. they mimicked or antagonized critical human hormones at extremely low dose exposure, adding an entirely new level of scientific evidence of their harm to human health. Endocrine disruptors have been identified as causing a wide spectrum of harm, especially at the earliest, most critical stages of human development; in utero, infancy, and childhood. Clinical consequences include developmental disorders, reproductive toxicity, multiple cancers, immunosuppression, and damage to the brain and nervous system. Many pesticides degrade into metabolites that have even stronger endocrine disrupting characteristics.

Because of this research, in 1996, Congress mandated EPA test all pesticides for endocrine disruption potential. Thirty years later that still has not happened and EPA's regulatory process largely ignores the issue. Independent researchers meanwhile have strengthened the evidence of harm from endocrine disruptors. Glyphosate is still the most commonly used herbicide, despite increasing resistance developing in many plant species. It is now recognized as an endocrine disruptor. A detailed case against the use of glyphosate can be found here.

A third dimension of public health harm from pesticides has emerged in the last few years that almost certainly dwarfs the previous two. Scientists from throughout the world are finding PFAS in many of the most commonly used pesticides. The presence of PFAS can be both intentional and inadvertent, i.e. intentionally incorporated into the active ingredient, as inactive ingredients used to enhance efficacy, or from leaching from storage containers.

Three years ago, the CDC made an unprecedented recommendation that physicians consider testing their patients' blood for PFAS or "forever" chemicals. That they have never made any such recommendation for any other toxic chemicals speaks volumes about the unprecedented danger of these chemicals. In 2022, EPA made stunningly strict drinking water guidelines for forever chemicals; for the two main categories .02 and .004 parts per trillion (ppt). To give that a visual context, that is the equivalent of 1 drop of water in a lake the size of six Rose Bowl stadiums, and one drop of water in a lake the size of 30 Rose Bowl stadiums.



Then in April last year EPA made enforceable, nationwide drinking water standards for these chemicals that are so strict it means EPA essentially believes there is no safe level of PFAS exposure. They made the standard

equal to the detection capability of current technology, i.e. 4 ppt (parts per trillion).

Reflecting growing worldwide alarm in the scientific community, a pollution researcher at the UK's Liverpool John Moores University, Patrick Byrne, said PFAS are “probably the greatest chemical threat the human race is facing in the 21st century.” Twenty-nine states have adopted at least some laws to protect their residents from PFAS in consumer products and more is being planned.

Global contamination with PFAS now intersects with pesticide use because the evidence is overwhelming there is wholesale contamination of pesticides with PFAS chemicals, and many pesticides break down into still toxic, short chain PFAS type chemicals. Seventy percent of pesticides introduced to the market since 2015 qualify as PFAS compounds. As a former EPA scientist, Kyla Bennett said, “If the intent was to spread PFAS contamination across the globe there would be few more effective methods than lacing pesticides with PFAS.”

There is already widespread PFAS pesticide contamination of every component of the global environment, including drinking water and the food supply. Nearly 100% of humans carry PFAS in their blood in very disturbing amounts, including newborns, and pesticides are a major reason. Women, fetuses, infants, and children are more susceptible to the health hazards of pesticides and PFAS. European scientists said, “The extent of this contamination is shocking. It is a result of political failure at many levels.”

Pesticide use in forested areas is largely unrestrained, and decisions about mass spraying are made by private contractors, lumber companies, and agency employees who have no expertise in the health consequences of the products they are exposing the public to. This lack of oversight or caution is irrational, and it is now wholly unacceptable. There is strong evidence that the mass use of pesticides is now a serious, global public health threat on an unprecedented level because of endocrine disruption and now PFAS contamination. Because these chemicals so environmentally persistent and refractory to thermal destruction, they are likely to also be found in any smoke emitted from the pile burning and prescribed burns depending on the timing of their use. Pesticides can drift thousands of miles from where they are applied. Typically about 25% of sprayed pesticides become airborne and capable of contaminated ecosystems hundreds and even thousands of miles away.

7. Aesthetic Damage to the Canyon

The EA says that visual disturbance of the scenic beauty of the prescribed burn areas may dominate visitor views, but that would only be a short-term issue, because regrowth would occur within five years or less. To characterize five years as “short-term” damage as license for this project is jarring rationalization. But that also means if indeed there were any fire suppression benefit from the broadcast burns, they would be equally “short-lived.” If this project is to last ten years, and but it’s presumed benefit only lasts five, then unless the Forest

Service plans on rotating, perpetual burning and chain saw management of the canyon, it sounds like the presumed benefit can only be described as temporary.

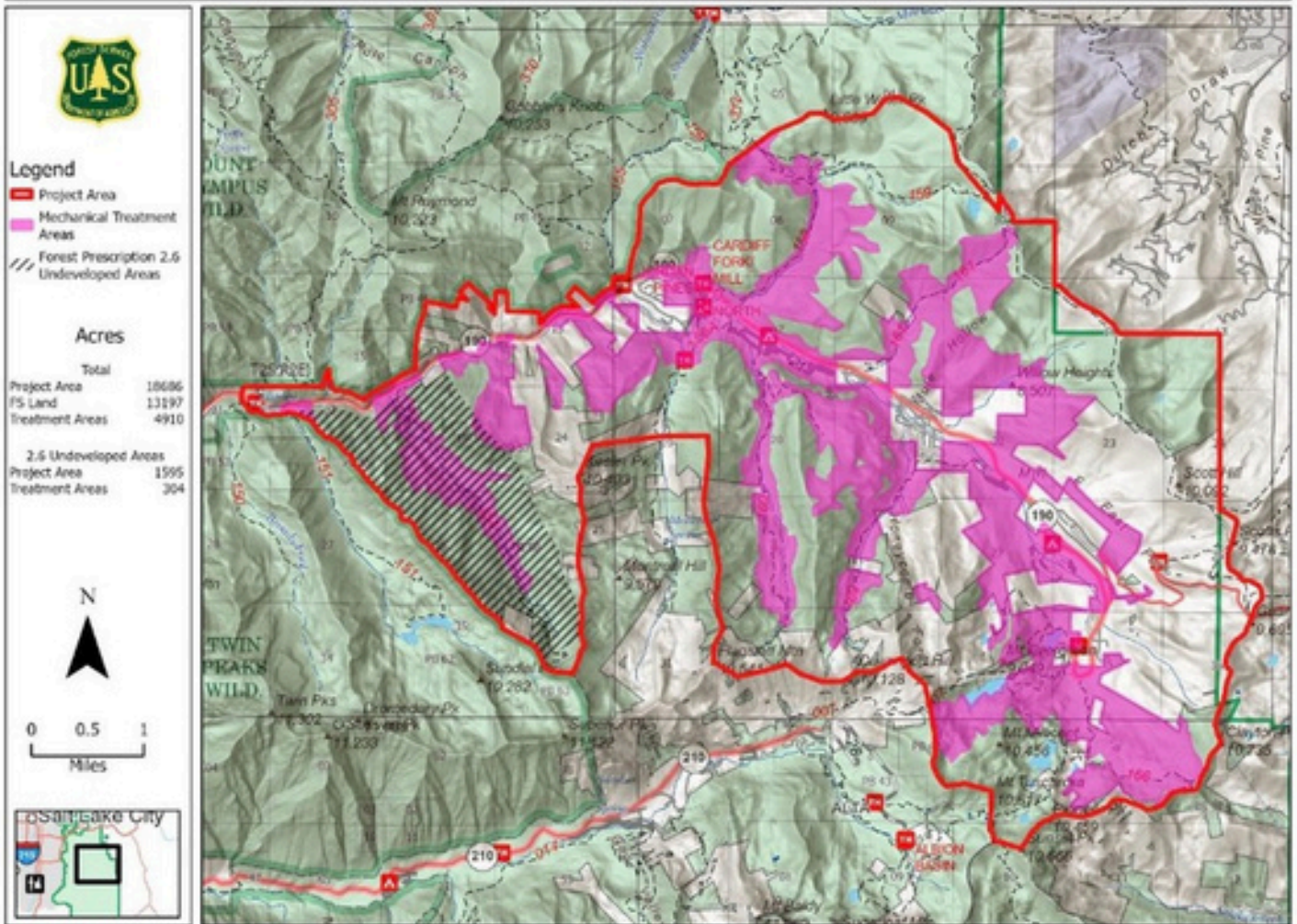
Moreover, in discussing the impact of broadcast burns, the EA says that impact on the soil would only last 1-3 years because ground cover would then return. If so, then the fire mitigation of the broadcast burn would be just as short lived. And if the surface vegetation removed is replaced with grasses, the fire vulnerability would like be worse than before the project as discussed earlier.

The EA admits “diminished scenic quality along trails,” and that “charred bark, limbs, and other features may be visible for many years.” The EA even states that it will take 20-30 years for the aspen they are trying to regenerate to develop a high canopy, to visually replace the loss of conifers.

The agency goes so far as to claim from two studies that are 30-40 years old, that “light prescribed fire are perceived to enhance scenic quality.” In other words, **the scenic degradation of the canyon will last for a generation, and we consider the agency’s attempt to spin this as a scenic enhancement is preposterous. Many of our members and the public will not live long enough to see canyon the without the damage this project will unnecessarily inflict.**

The agency’s map of the area to be mechanically treated (in purple) reveals just how large of an area will be affected.

Big Cottonwood Canyon Watershed Restoration Environmental Assessment Overview



8. Impact on Water Resources

For obvious reasons the seasonal opportunities for landscape and pile burning are limited to spring and fall and will often occur when there is snow on the ground. It is a well-studied phenomenon that dust and black carbon particles from any pollution source, landing on snow pack, reduces the surface albedo, accelerating the melt of snow pack and ice when those particles are exposed to sunlight. Furthermore, the phenomenon creates a feedback loop such that as the snow melts, the black carbon concentrations steadily increase, warming the temperature of the snow and accelerating the premature melting as it progresses. Indeed, dust from the dried-up Great Salt Lake lakebed was estimated to cause the Wasatch Mountain snow pack to melt 17 days earlier than would have happened otherwise during the 2021-2022 winter.

The exact same phenomenon will occur from any burning conducted by the Forest Service in Big Cottonwood Canyon. Given that the central risk factor for increasing the vulnerability of the canyon's forest to wildfire is

lack of snow, this project is set up to be self-defeating, even if all the other assumptions being made by the agency are correct.

Adding to that, in the immediate aftermath of a fire, manmade or otherwise, the snowpack disappears faster. Removing trees and opening up the canopy exposes the underlying snowpack to more solar radiation which also melts the snow faster. As discussed earlier, removing trees increases wind in the forest which not only accelerates fire spread, but can contribute to snow pack loss even if the loss of trees increases the original amount of snow fall.

9. Impact on Birds and Wildlife

We refer you to and endorse the comments of Dr. Sarah Johnson regarding the impacts of this project on wildlife.

Conclusion;

We do not dispute some of the ecological problems identified by the Forest Service. But we dispute the solution the agency is pursuing. The very best that can be said for the project's impact on wildfire vulnerability is that there is uncertainty about its value. There are good reasons to be suspicious of Forest Service sponsored research being used to justify its national wide campaign of "fuels reduction." We believe independent research strongly suggests that it is much more likely to be self-defeating for the purpose of reducing the risk of intense wildfires. If there is indeed an "emergency" fire risk justifying reducing public input, then the response should be focusing on forest home protection, the technique of "home hardening and creating defensible space," not giving home owners the false promise that landscape scale forest thinning will protect them.

There is no dispute that the project will exacerbate the climate crisis, which is clearly the primary driver of Western forests' increased vulnerability to wildfire. Likewise, there is no dispute it will be a serious public health hazard. Air pollution literally kills people and causes and exacerbates a list of diseases as long as those from smoking cigarettes. Prescribed burn smoke is actually more toxic than wildfire smoke. The project will have a negative impact on water quantity and quality coming from the canyon, and will be an aesthetic degradation to an important recreational refuge for millions of people for a generation. We urge to you abandon the project in its current form.

Sincerely,

Dr. Brian Moench

President, Utah Physicians for a Healthy Environment (UPHE)

Board Chair, Doctors and Scientists Against Wood Smoke Pollution (DSAWSP)

Jonny Vasic

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