Going Smokeless In Seattle:
A Guide to Getting There

Residents of Puget Sound have had a glimpse into our future with the smoke laden skies of this past summer. Changes to our region's weather patterns resulting from climate change are hard to predict. If those changes result in drier, longer, and warmer summers, the problem will intensify. Even if our weather patterns remain essentially unchanged compared to historical norms, our smoke problem will not probably not improve. The origin of our problem has more to do with the quiet storm brewing under our feet than the atmosphere above.

Three separate issues, all long in the making, are bringing our emerging forest crisis front and center. They are: 1) the unnatural accumulation of biomass in our forests, 2) outdated and inappropriate forest management and logging practices, 3) 85 years of largely successful fire suppression.

My comments are focused on the forested regions of Washington east of the Cascade crest. Specifically, the forest ecotypes of central and eastern Washington. The identical problem extends far beyond our region's boundaries to include millions of acres of forested lands across the western United States, including the provinces of British Columbia and Alberta. The scale of the problem is so vast and of such an enormous scale that we have virtually assured that the situation will not get better for a very long time. The remedy, if we have the collective will to address the problem, will take at least as long as we have been engaged in exploiting our forest resources. In all likelihood, it will take longer.

How We Got Here

For the past eight years, I have been engaged in a forest restoration project located on the eastern slope of the Cascades in central Washington. My 40 acre parcel was once part of a 160 acre homestead that was logged about 100 years ago. It is a low-to-mid elevation, mixed conifer forest consisting primarily of Douglas fir, Ponderosa pine and Tamarack. As was customary at the time of the original harvest, no effort was made to clean up and dispose of the logging residue. All of the branches, tops, and defective logs were left in place where they fell.

The good news is that the land naturally regenerated remarkably well over time. The bad news is that over the intervening decades no effort was made to either clean up the original logging debris or to thin out the forest that regenerated. Consequently, the timber stand that has emerged is a densely stocked thicket of crowded trees competing for water, light, and nutrients. It features a closed canopy where very little light reaches the ground. The forest floor is devoid of browse grasses and shrubs. The poor vigor of the timber stand makes it vulnerable to endemic insect populations and disease.

A continuous mat of decadent woody debris carpets the ground. This material is referred to as "slash" and/or "fuels". Compounding the problem of accumulated biomass at my site is the ongoing mortality associated with natural competition, periodic drought, insect predation, wind throw, disease, and snow loads. Dense layers of woody debris extends from the ground up to a depth of 4 feet in spots. Worse, many dead trees with fully cured branches attached now lie at various angles above the ground. Those features are known as "ladder fuels" and provide a pathway for a ground fire to quickly transition vertically into the forest canopy above. In my case, my forest crown cover is a "closed" canopy, wherein branches from one tree meet and intertwine with those of adjacent trees.

My site is a tinderbox primed for ignition. It is a question of when that occurs, not if. The moderate to steep topography of the site is problem enough. Add a bit of wind, a hot summer day, a random lightening strike or bit of human folly, and my timber stand will be gone in a matter of minutes. A catastrophic fire such as this is referred to a "stand replacement fire event" where everything is consumed by fire. No amount of fire hoses, fire crews, bulldozers, air tankers, water dropping helicopters, or other firefighting resource will have an impact on the outcome. The sheer physics of the scenario are simply too overwhelming to be overcome. The prodigious volume of accumulated biomass and dense stocking of trees virtually assures total devastation. Persistent and strong winds are a prominent weather feature of the area. Weather conditions alone at the time of the fire will dictate how large the fire becomes.

I know this from my background in firefighting. I have been there, seen it, and done it many, many times. My experience includes fighting fires in every western state save one. I've been back east to Minnesota, and fought fire in Alaska as well as the Canadian provinces of the Yukon and Alberta. I've fought fire in every conceivable fuel type, topography, and burning condition. While nearly all of my experience was in the initial attack stage of fighting fires, I have done quite a bit of prescriptive and controlled burning over the years in the months prior to and following fire season. Thousands of acres worth, not including the burning I do every spring and fall at my site. Tactical assignments on large wildfires include backfiring operations comprising large acreage totals, 8,000 acres in one night alone in northern California. I have been at ground zero on the business end of a chainsaw or fire tool for many years and speak from experience.

Research literature describes a historical frequency of fire at my location occurring on an interval of 8 to 18 years. Fire played a crucial role in the development of forests in my ecotype by maintaining tree stocking levels at reasonable numbers. Surviving trees had more room to grow and develop healthy crowns and foliage. Because the trees were healthier, resistance to background insect populations and disease was enhanced.

More importantly, frequent fire disposed of the natural accumulations of falling limbs and mortality. For the most part, those frequent fires were low-intensity events that served to regulate the accumulations of woody debris (biomass) on the forest floor. The literature also confirms there were areas that sustained more serious damage, including stand replacement fire events. However, those acreages were typically isolated and generally on the smaller side. Historical photographs and descriptions by early settlers describe forests consisting of trees of large size, many hundreds of years old. Many of these trees bore the telltale scars of fire on their thick bark. Yet, these trees were healthy, large, and enduring.

Despite their apparent similarities, the forests west of the crest and those on the eastern side of the Cascades evolved under very different conditions. The most significant difference is the matter of moisture. That is, the temperate rain forests surrounding Puget Sound as contrasted with the much warmer more and arid regimes around Winthrop or Ellensburg, for example.

Moisture has a profound impact on the rate of decomposition of woody debris. East side forests lack the moisture that fungi, bacteria, and insect communities needed to transform woody debris into humus and then ultimately into soil. In the warmer and much drier forests east of the Cascade crest, the decay of woody material is a very, very slow process. This is obvious at my site where I routinely unearth desiccated harvest residues from one hundred years ago. For all practical purposes that debris remains largely intact. I have a good understanding of the biomass accumulation rate at my site thanks to the clearly identifiable layer of ash deposited with the eruption of St. Helens in 1980.

On the east side, biomass accumulations were largely regulated by fire, not decomposition. Published research confirms this fact. It has been well over 100 years since fire passed through my drainage in central Washington. An astonishing amount of biomass has accumulated over that time. Not just at my site, but the 250,00-300,000 acres that comprises my drainage. This process is identical to what has been going on all over our western states and Canada.

Fixing the Problem

My project consists of thinning trees and disposing of the many hundreds of tons of accumulated biomass. I dispose of these materials by burning them. Trees selected for removal include those infected by disease or show evidence of insect predation. I retain my best trees as I go, saving the dominant and co-dominant specimens having phenotypical characteristics such as good crown development and form. I remove suppressed trees, especially those with compromised crowns, trees with forked or damaged growth leaders, and those trees exhibiting signs of stress such as poor needle color and overall lack of vigor.

Many of the trees I remove are in the 2”-4” diameter range. Often times these trees have growth rings too closely spaced to count without use of a magnifying glass. Most of the trees I remove during thinning are 8”-10” diameter at breast height, some of which may be 50‘ tall or higher. Many of those trees are one hundred years old or more. Very harsh growing conditions indeed.

Trees having poor vigor are vulnerable to disease, insect predation and wind throw, as well as damaging snow loads in years of heavy snowfall. The tall and spindly structure of a suppressed tree trunk cannot support the heavy weight of snow and ice at treetop level. If the upper half of the tree isn’t sheared off by strong winds due to the weight of the accumulated snow and ice up high, the tree will bend over in a graceful arch. In time, the tree is uprooted and falls to the ground, contributing to the already off-the-charts fuel loads at the site. Insects then feed on the downed trees and their populations can increase dramatically when this food source suddenly becomes available. In the case of pine, once the beetles have devoured this feast, they move on to predate on otherwise healthy trees. Under normal circumstances, those trees would likely be able to withstand an attack from normal background populations of beetles. Climate change has played a significant role in their reproductive cycles.

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A Guide to Getting There

The only economic method of disposing of my pre-existing fuels, plus the limbs, tops, and stems of the trees I thin out is to burn the material. Any stem larger than 4” in diameter is man-hauled off the hillside to the road where it is later skidded by dozer to a central location where it is merchandized into firewood. That wood is sold locally. The volume of biomass from pre-existing ground fuels and thinning residues I create is enough to heat dozens of homes all winter long. It is sad that this residue cannot be put to better use, but the stark economic realities of my operation and that of countless others leaves only tough choices among a very short list of lesser evils.

Some will criticize the practice of burning because of the smoke and particulate matter put into the air. No argument. Others will decry the added carbon dioxide (CO_2). An aspect of that criticism is valid, but only partly so. As for CO_2 contributions, a basic understanding of the carbon cycle is fundamental to comprehending the complexities of the issue.

Whether this material naturally degrades on site or is burned, net CO_2 production over time is identical. In some respects, natural decomposition can be worse because of the production of methane (CH_4) during the decomposition process. Methane is at least twenty times more potent as a greenhouse gas than CO_2.

Other well-intentioned but uninformed folks will suggest chipping or mechanical mastication as an alternative to burning. It isn’t as simple as that. Aside from the challenges of steep ground and the unaffordable expense of the method, there are far more serious implications to consider, a few of which I will describe.

The Root of the Problem

Perhaps the most significant consideration to chipping or mastication as a disposal alternative is the inconvenient fact that while the physical characteristics of the fuel have been altered, net tonnage of biomass on the ground remains unchanged.

It is wishful thinking to believe a ground-based chip-type fire allows for easy containment. This is a erroneous assertion that reveals a lack of fire experience. In wind-driven fire events such as the conditions that existed during our largest fires of recent years, wind was a major factor in rapid spread rates. Add the effects of slope and a stiff breeze, and the flame length of chip fires can easily reach lengths of 15’ or more. It isn’t long before a ground fire quickly migrates upward into pre-heated tree crowns above.

Despite this fact, an entire industry has blossomed based on the fallacy that biomass mastication or chipping is the solution to fire-wise prevention strategies and fuels management. In some very limited and specific applications this may be an appropriate technique. In most situations it is not. The practice deceives the well-intentioned public into falsely believing it will help save their home or land, but it has no basis in fact. I’ve witnessed the losses and the emotional trauma of landowners who believed they’d done everything they could and should to protect their homes only to see them go up in flames.

“It’s the fuel, mate!” I don’t aim my frustration at the landowner, but the snake oil contractor or advisor that convinced them of the efficacy of the strategy. When initial attack fails, wind speed is often the predominant causal factor. Wood chips are a combustible, pure and simple. It is no different than laying out rolls of cardboard across the ground. This is especially true in low relative humidities.

Lets examine the issue in further and understand why the method also fails to protect forests.

In instances where chipping is used, the depth of the biomass resting above the soil surface is significantly increased. When enough chipped material is added above the soil in a forest, a prolonged and intense heating event occurs. This has the effect of raising the temperature of shallow, east side soil profiles to temperatures that are lethal to the root systems of trees. In the aftermath of a fire’s passage, tree branches and needles may not exhibit visible signs of damage by scalding or scorching, but the needles eventually turn brown and the tree succumbs within weeks. Overall mortality remains unchanged because the root systems are irreversibly compromised from being overheated. What is the value in going to the expense and effort of chipping biomass when net tree mortality remains unchanged?

In many cases the end result can be even worse, because the long burn time and intense heat sustained by thick layers of biomass can sterilize the entire soil profile, consuming the vital humus layer where important symbiotic fungi such as mycorrhizae reside. This fungus is an important soil inhabitant that assists the tree in the absorption of nutrients and minerals in the root zone.

Soils and forests in the drier climes of the east side survived rather well despite the regular occurrence of fire. Those fires served to regulate biomass accumulations. When you heap loads of biomass on tree roots and then set it alight, the results are predictable. When the soil profile is destroyed the rehabilitation clock is set back by years, if not decades.

A far more insidious and somewhat counter-intuitive consequence to the chipping strategy arises in the important matter of **interception** versus **infiltration** of moisture. When excess accumulations of biomass gather over the soil, whether it is in the form of needle litter, branches, or larger debris such as downed logs, any precipitation that falls must first saturate the overlying debris before it can migrate downward into the root zone where it is available to the tree. Excess biomass sitting atop the soil is analogous to placing a giant sponge across the forest floor.

In the arid regimes of our east side forests, this woody debris represents a significant barrier to recharging the soil profile with moisture. This is especially true during the dry summer months when rainfall is sporadic and limited. Because the vast majority of tree growth occurs in the months of May and June, soil water content has a direct impact on foliar growth. Good foliar growth directly impacts tree vigor. That, in turn, ultimately affects its ability to withstand insect predation and its resistance to disease. Downward migration of rainfall and snowmelt becomes equally important in the late summer months of August and early September when trees tap whatever available moisture remains in the ground.

Thinning trees also impacts how much snow makes it to the ground in the winter months. In a fully closed canopy situation where trees crowns touch one another, a significant percentage of the winter's snowfall never makes it to the forest floor where it can be absorbed. Published research confirms that as much as 20-40% of the snow that falls in a given water year is lost to sublimation and evaporation when the snow comes to rest on needles, branches and tree tops. At my site, this represents a significant loss of potential moisture. All the tightly spaced trees compete for this moisture. Before long, a chronic state of water deficit takes hold in the soil profile. This eventually contributes to a loss of tree vigor, and ultimately, more mortality that leads to higher fuel loadings.

True, evaporation can be lessened or postponed a bit by having a thin layer of woody debris atop the forest floor, but an inch or two of soil beneath that debris achieves the same result. So does a good crown cover with proper tree spacing. More woody debris atop the soil is not necessarily better. What is most important is how much moisture is available in the root zone when trees are utilizing it in the early summer months when they are putting on the majority of their new growth. By late July, the tree is done with its foliar additions and 90% of its fiber growth for the year. Tons of slowly degrading biomass on the ground is not only unhealthy for the trees, it is unnatural for that ecotype. Nature never would have allowed this situation to develop where fire was a frequent visitor. We must remove these excess accumulations of biomass, either by reintroducing fire or physically removing it.

Tree rings tell the story. I study them frequently, both on the trees I select for removal during thinning as well as bore samples I routinely take from retained trees in areas I treated early on in the project. Not only are there visible improvements to the health and vitality of the tree foliage in the treated areas, but the growth rings reveal a favorable response to their improved growing conditions. Ring counts reveal a minimum increase of at least twice the previous growth rate. That trend will continue to improve in time. Moreover, the threat of a catastrophic fire has been significantly reduced.

The process of excess biomass accumulation is going on across millions of acres in the west. Consider how fires in recent years are becoming larger and harder to stop. More vegetation and more trees across the landscape are competing for a finite amount of water. This process is compounded in drought years. The trees become stressed and vulnerable to disease and insects. Mortality results. This dead material creates additional fuels. More fuels means more intense fires that are becoming almost impossible to contain, even with DC-10's and 747's dropping retardant at great expense to taxpayers. We have entered the era of mega-fires of unprecedented intensity and severity. Ask any seasoned firefighter why stopping these fires is becoming so difficult and they will confirm this fact.

The brush fires of California are a different breed altogether with other factors at play. Another story for another time perhaps.

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A Guide to Getting There

The combined inputs of pre-commercial thinning and fuels management inputs are expensive and labor intensive activities. It is hard, physical work. An investment in pre-commercial thinning pays for itself only on the highest growing sites. That is, those areas that have the highest growth potential. This is mostly a function of precipitation and the length of the growing season. Almost all of the Site Class I and II regions are west of the Cascade crest. In my region, pre-commercial thinning and fuels reduction offer a negative return investment from a financial perspective. There is no economic justification for the investment and this explains precisely why little to nothing is being done.

I finance my operation primarily by paid-in-capital and firewood sales. Firewood receipts do not begin to cover my direct operating expenses or capture the depreciation on my equipment. My operation is bare bones and I keep my expenses at rock bottom. I entered the firewood business to defray the costs of the tonnage-based burn permit fees I must pay to the State. None of that money goes towards cleaning the air. It merely serves as a revenue stream to the State. It would probably be more efficient for me to burn the tree trunks that I salvage for firewood along with the rest of my debris, but the volume (tonnage) involved is significant. Think of a line of six or seven fully loaded logging trucks consisting of small diameter, spindly and crooked stems and you'll get the idea. And that's just the firewood. The total tonnage of debris that I burn every year would fill up several chip trucks. My belief is that it is far better to derive whatever benefit I can from this biomass in the form of home heating than to waste the resource in open burning.

Understanding the Carbon Cycle

Whether my thinned trees are burned in place, used to heat someone's home, or they are left in the field to rot and decompose, net CO_2 over time is identical. This fact is frequently, if conveniently, ignored by some. Of course, there is the smoke and particulate pollution of my fires. Proper burning techniques can significantly reduce these emissions. (All nutrients remain in place, albeit in a much more readily available form. The exception being nitrogen, which is unavoidable lost during combustion.) And yes, my CO_2 releases are immediate versus the gradual emissions produced in the decomposition process. No argument there.

Even if I could afford to chip my debris, what would I do with mountains of it? I'm certainly not going to put it back on the ground.

I am all in favor of letting our forests burn. But before we go down that road an intermediate step is required. Our biomass accumulations are simply too large to reintroduce fire without first reducing our existing fuels. Not doing so will result in even more catastrophic, large-scale fires producing even more smoke, loss of property and forest cover. Additionally, watershed values will be negatively impacted. Degraded water quality and flooding will likely result. There will also be significant losses to fish and wildlife habitat.

Several euphemisms have emerged in some quarters of the timber industry to explain their practices when it comes to post-harvest slash disposal. One of my favorites is the term "nutrient cycling." Sounds good, returning biomass to the forest floor, but it is not appropriate for all ecotypes, especially in our east side forests. We cannot blithely employ one technique used successfully in one ecotype and apply the same treatment strategy in a fire dependent ecosystem. The residue simply does not decompose in the arid climate. Instead, the slash becomes an enduring combustible that hampers fire containment efforts. I've dealt with swaths of decades old slash many times in my firefighting career. The heat is intense. In many cases, firefighters are forced to back off and go with an indirect attack and use air tankers and bulldozers to assist with fire line construction. If those resources are available, that is.

Choosing Among Lesser Evils

We have two paths to choose from, we can replicate nature's housekeeping processes or let it burn. The solution is neither quick or easy. It will take leadership, political will, education, and gut-checking resolve. And, lots of money. If we spent a fraction of what we currently do for fire suppression every year on addressing the underlying cause of the problem, we might be able to gradually turn the ship around and begin the slow process of reversing decades of mismanagement and irresponsible resource exploitation.

Educating the public will be an essential part of the mindset we will need to accomplish the task. This includes the notion that smoke from controlled and prescriptive burning is an abomination and should be taxed or banned outright. We cannot eat our cake and have it too. The brutal reality is that we have painted ourselves into a corner with a very limited range of options to choose from. The true cost of our ways is just now beginning to be realized, both in direct suppression costs and associated societal costs. We can no longer afford to ignore the worsening problem and stay our present course and expect a different result. The status quo is unaffordable. It is not sustainable. Our present strategy ensures the gradual demise of our forests, albeit in a far less dramatic and headline-grabbing way than mega-fires do.

We can begin by thinning our forests and removing our prodigious backlogs of accumulated biomass. We do this in a systematic and strategic way, on a landscape-wide basis, treating entire drainages at a time. My small project protects my investment, but without tying it into part of a wider treatment strategy it is an irrelevant contribution towards solving to the larger problem. We need to enter an area once, thin out the younger trees, remove the suppressed, diseased, and bug infested trees. We must manage for appropriate stocking levels by creating space among the trees so that they remain vigorous. While we are doing that, we aggressively reduce the biomass backlog by physically removing it.

Once we have finished treating a given area, we establish defensible boundary perimeter and leave it be. When a fire starts in the treated unit, we allow it to burn and let fire resume its natural housekeeping duties. We will no longer spend millions of dollars and endanger lives by fighting a fire that only the weather will extinguish. After a few decades of this, our suppression expenditures will begin to decline and we will eventually have a healthier forest and all that goes with it at a far lower cost. Yes, there will be smoky days, just as the first settlers observed when they arrived in the northwest. We can begin prescriptive burning when it becomes necessary without enduring catastrophic losses. We will have better control over how intense future fires become.

The entire process however will require the buy-in of all stakeholders. This includes timber companies, Federal and State agencies, as well as tribal land managers. All of us. If you live in a structure built of wood or use toilet paper, you have skin in the game. Private landowners will be required to maintain sensible, fire-wise vegetation clearances around their developments. In exchange for reducing their fuels and improving their forests to certain standards, we as a society agree to protect their homes and property. We will not, however, expend public treasure to defend buildings that are constructed with inappropriate materials or timberland that is not properly maintained. We routinely subsidize insurance claims and resource losses because of bad choices. Those costs will increase with every year that passes and every branch that falls to the ground.

Money

Two things must occur simultaneously in order for this process to get off the ground. Both are necessary to overcome the headwind of negative financial return of the inputs of thinning and fuel reduction schemes.

First, we must find a method of using all this woody debris to some appropriate end. The production of biofuels is one such potential, but in all likelihood the best application for the material is producing electricity through direct combustion. This is a mature technology that continues to see incremental efficiencies and lower emission profiles with every new installation. Examples of biomass or “co-gen” power abound. Many saw and pulp mills use bark and sawmill residues to produce heat and power for their operations. This includes drying kilns for lumber and production of pulp and paper, a very energy-intensive industry. At many of these mills, excess electricity is generated and uploaded to the grid for distribution by local utilities.

The second investment necessary would be sawmills capable of processing small diameter, low value logs. In order to attract the capital necessary for both sawmills and biomass power plants, investors must be assured of a steady flow of raw materials. Economies of scale must be achieved for either to operate profitably given the low value of thinned trees and biomass materials. Without a reliable flow of raw materials, investors will not make the investments needed. Capital will gravitate to opportunities having lower overall risk and higher returns on invested capital (ROIC).

Uncertainty over long term access to timber has shuttered several mills in my area. There is a chip mill an hour away, but the price paid per ton for chip logs barely covers the cost of getting the logs off the hill and onto trucks for delivery to the mill yard. At best, the margins in the chip log trade are razor thin.

Before mill operators threw in the towel and shut down operations for good a few years ago, they were having a tough time sourcing wood because nearly every timber sale on Federal and State land was challenged by lawsuits. Some of the legal actions had merit, others did not. There is a vocal contingent that does not want timber to be harvested on any public land. Consequently, there are no longer any local sawmills buying logs of any size. Jobs and tax revenues are lost.

There is a small market in the area for export logs to China, Korea and Japan, but that trade is highly variable. Logs are loaded into containers and then aboard ships at the ports of Tacoma and Everett. Recent trade disputes involving those trading partners adds even more uncertainty. It is likely that market will narrow in the near term or disappear entirely. We are not the only country that exports whole logs. Our neighbor to the north has a robust log export business that would happily accommodate any increase in demand, as would New Zealand or Russia.

Both sawmill and biomass powered generation plants are needed for the plan to succeed. Without a market for thinned trees and biomass residues, the cost of thinning and fuel reduction make the inputs uneconomic due to the costs involved. There will never be enough public money available to achieve what is required for inputs on State, Federal, and tribal lands. Timber companies know the return on the investment is negative. Shareholders and stock markets do not reward altruism and virtue. It’s all about ROIC.

The only way to get the work done is to have it finance itself, or least get the cost down to the point where the investments of thinning and fuel reduction become cost neutral. A sawmill or engineered wood products plant using thinned small diameter trees could be profitable if the uncertainties associated with supply were resolved. The combined synergies of having markets for both biomass and thinned trees are needed underwrite the expense of the inputs. Revenue streams from both materials is essential.

What is an Environmentalist?

Regrettably, much of the opposition to forest biomass power has come from some in the environmental community. This comes as something of a surprise because one might think they would support an opportunity to promote a sustainable and renewable energy resource that is currently going to waste.

Every megawatt produced from excess forest biomass has the potential to displace another megawatt generated by coal, natural gas, or any other current below-ground, sequestered source. By using biomass feedstocks, above ground materials could be used that are well into their CO_2 off-gassing cycles. If these inputs can pay their own way, we have an opportunity to change the outcome. What we have now is an tragic waste of a material that is either burned openly in the field or is decomposing and producing CO_2 with zero public benefit.

One local environmental activist I discussed this topic with was against forest biomass power because it had the potential to displace the renewables of solar and wind. He and others successfully lobbied Senator Maria Cantwell to formally oppose forest biomass power. It is hard to defend such staunch parochialism in the face of such an overwhelming problem.

The related matters of forest health and biomass accumulation is a conundrum of its own. This problem comes with a very short list of remediation options. If we can agree on the science of the carbon cycle and how to best use excess biomass through the lesser evil of power generation, we can begin to address the problem at its source.

Declaring biomass power as a contributor of CO_2 and therefore unsuitable as an alternative energy source is misguided. It ignores the 400 pound gorilla lurking in our forests in the form of ever growing volumes of biomass, mega-fires and declining forest health. This mindset discourages workable solutions and serves only to put our collective heads deeper into a dark place, safely sequestered from reason and the science of the carbon cycle. It is ironic that the community so frequently associated with sustainable strategies and the preservation of forests is now so unwittingly complicit in their slow and inevitable destruction.

I fully support developing renewables such as wind and solar, but their collective contributions will not meet our growing energy appetite quickly enough. Regrettably, it boils down to choosing among lesser evils.

If we choose to not touch our forests and let nature take its inevitable and predictable course, we must be willing to accept the inevitable consequences of what comes with that decision. This includes declining forest health, mega-fires, smoke, and other social costs. If we choose to continue fighting fires, we MUST manage our growing inventory of biomass with sensible, sustainable, and affordable mitigation strategies.

-Michael August

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