

331 - Wildfire Management

Causes (Scientific and Ecological) and Frequency of Wildfires (Vaughn Spargur)

Definition (Wildfires - Wikipedia) - A wildfire or wildland fire is a fire in an area of combustible vegetation occurring in rural areas. Depending on the type of vegetation present, a wildfire can also be classified more specifically as a brush fire, bushfire, desert fire, forest fire, grass fire, hill fire, peat fire, vegetation fire, and veld fire.

Causes - (Wildfire Causes and Evaluations, National Park Service);
("Wildfires", Wikipedia)

1. The "Fire Triangle" - Fires need 3 things to start and grow.
 - a. An ignition source
 - b. Combustible material
 - c. Supply of oxygen.
2. Ignition Sources
 - a. Man or manmade.
 - i. Intentional Acts of Arson
 - ii. Negligence
 1. Unattended campfires (Either not put out, or not properly put out)
 2. Thrown out cigarettes
 - iii. Accidental
 1. Burning of debris that gets out of control
 2. Sparks from vehicles/equipment..
 3. Power line arcs
 - b. Natural
 - i. Lava
 - ii. Lightning
 - iii. Spontaneous Combustion of dry materials like sawdust and dry leaves

3. Combustible material -

- a. The more dry materials available in an area (such as deadwood, leaves, sawdust, dry/dead grass/vegetation, the easier it is for fires to start.
- b. Parts of the country that experience dry summers (like much of California) are therefore naturally more likely to experience wildfires than say the great lake states such as Ohio, Indiana, Illinois, or Michigan.

4. Source of oxygen.

- a. High winds make wildfires worse because they not only make it easier for the fire to spread quickly, but they also feed oxygen to the fire.

"Where a slope is going upwards at a 10% gradient that would double the speed of the fire, if it's 20% it would quadruple the speed of the fire," Rob Gazzard, technical advisor to the Forestry Commission tells Newsbeat.

"That's because it's pre-heating the fuel above it. So if a fire is going up a mountain it will go very fast."

Fuel includes everything from trees, underbrush and dry grassy fields to homes. The more fuel there is, the more violently the fire will burn.

Plus if it's really dry - like it has been in California - the fire it creates is much more difficult to control.

<http://www.bbc.co.uk/newsbeat/article/41608281/wildfires-why-they-start-and-how-they-can-be-stopped>

History - Past wildfires and how they were managed (Jacob)

History of wildfire management and examples

The need for a US Forest Service was first championed by conservationist Franklin Hough and after massive fires in the late 1800s threatened future commercial timber supplies. In 1905 the US forest service was established. It was given managerial control over what we now know as national forests. The prevention of wildfires fell under the managerial scope of the Us Forest Service. The first major test for the agency came 5 years after its inception in what became known as the “Big Blow up.” The Big Blow up was a series of forest fires that burned 3 million acres across the states of Montana, Idaho and Washington in only a few days. Like all disasters, those in favor of more government used the occasion to further justify increasing the resources allotted to the government agency. The Big Blow up was no exception, administrators with the forest services blamed the devastation on not having enough men and equipment on hand.

Worse still, the big blow up was enough to convince members of congress and the public that TOTAL fire suppression could prevent a recurrence of a similar type of event. To further push this agenda, three men who fought the fires in 1910’s Big Blow up would serve as Forest Service Chiefs from 1920-1938. While in this position all three assisted in instituting a policy of total fire suppression. The total fire suppression policy had two goals, prevent fires, and suppress fires as fast as possible once they had begun.

HERE IS WHERE BAD POLICY NEGATIVELY AFFECTS the locals. The Forest Service quickly opposed the practice of light burning even though ranchers, farmers, and timbermen favored it as it improved their land conditions. This is where the beginning of the wildfire paradox truly starts to take hold in the US. **The wildfire paradox states that attempts to exclude fire from systems that evolved with frequent fire will in some cases simply amplify feedbacks that increase long-term risks.** The Forest Service did not take this into account and simply argued

that all fire in wooded areas was bad as it destroyed standing timber. On a side note, around this time in 1944 Smokey the Bear is introduced as a way to spearhead the message of total fire prevention.

With regard to the second goal of the program, the forest service had to develop a systematic approach to fighting fires. At the beginning this meant the construction of roads, communication systems and ranger stations to protect and oversee both federal and non federal lands. This is the beginning of a more established relationship between the state and federal government for firefighting. This framework would later include private forest associations and landowners. Like all federal government programs, financial incentives were offered to states to fight fires. The National fire policy was born out of these financial incentives. Several fires continued to arise in the early 1930s which only further bolstered the appetite for fire suppression. Out of these fires, the federal government created the Civilian Conservation Corps in 1933. This put thousands of men to work as they created fire breaks and fought fires. The campaign to eliminate fire from the landscape quickly took hold and was aided by new technologies such as airplanes and fire suppressant chemicals. These advances in technology increased the operational reach and effectiveness of the governmental agencies ability to fight fires. Fires could now be fought almost anywhere and the government did not hold back.

This obsession with controlling large fires continued into the 1970s but during the 1960s, scientific research began to demonstrate the important role fire played in forest ecology. Their research would finally reach the Forest Service's policy makers. They began to acquiesce to the idea that some fires should be allowed to burn. This is where the "let-burn" policy began in the 1970s. It has since evolved numerous times throughout the years.

The new policy suffered a setback in the wake of the 1988 Yellowstone fires. The Yellowstone fires in 1988 are the largest in history for the Yellowstone

national park. While the size and scope of wildfires in the US in some areas were *decreasing slightly* due to the “let-burn” policy, Yellowstone had not had a fire in quite some time. So when the Yellowstone fires of 1988 came and burned thousands of acres, the public was quick to question the perceived ineffectiveness of the forest service. This coupled with the media sensationalizing the effects of the fire led to many demanding a change to the national fire policy. Of note however, not long after the fires resided, plant and tree life quickly re-established itself in the area. The regeneration of life in Yellowstone after the 1988 fires has been highly successful.

Another terrible day in the history of wildfire prevention was July 2, 1994 in what is known as the South Canyon Fire. A fire caused by a lightning strike in Colorado. Over the course of several days, the fire grew in size. The Forest Service did not respond for 3 days after finding out about the fire. This culminated in the deployment of a crew consisting of 10 Prineville Interagency Hotshot crew members and 9 smoke jumpers creating a fireline to prevent the fire from spreading into the town of Canyon Creek, who were previously instructed that everything was fine and they should do nothing. Their efforts were in vain however as a dry cold front aided the fire in enveloping the firemen. Unable to outrun and evade the 100 ft flame walls feasting on pinyon-juniper fuel, 12 firefighters perished. At a separate location, 2 other crew members perished. While the fires were the cause of death, poor management of the resources and personnel on ground contributed greatly to the firefighters demise. **This only highlights that national policies and government agencies have real ramifications.** The Forest Service only followed part of their own philosophy; they let it burn. However, they did not establish containment, do controlled burn, or thin out the timber in the area, which is the other more important half of the “let it burn” philosophy.



In the last 25 years fires have continued to grow in size and ferocity which has led firefighting absorbing 50% of the forest service budget. This means less funds are available for other land management activities such as land

restoration. Part of the rise in cost is also a result of new technologies. While they are effective in fighting fires, there are accompanied by an increase in costs. We continue to react to the ever increasing severity of fires with more money and resources without addresses the root causes or without fully understanding the effects our policies have on the ecological system. Its similar to how we fight terrorism I suppose. We fight and destroy ever increasing threats as they arise without fully understanding the underlying reasons as to why they continue to come up in ever increasing strength in the first place. **Our policies, both past and present, have created an environment in which these issues will continue grow and affect the lives and personal property of us as citizens of the US. We are living in a time where we are dealing with the effects of blowback. Whether it is wildfires or terrorism, we must understand that throwing money and resources at the symptoms of the problem is not a feasible long term solution. We must look to address the root cause of the issues we face as a country. At a minimum our personal property is at stake, at worst, we are putting people's lives in danger.**

In our present day, the Forest Service is attempting to address the wildfire paradox addressed earlier. Tools like forest thinning and a version of the "let-burn" policy are being discussed and/or implemented to deter the business as usual approach of refusing to allow fires to burn in ecological systems that were developed through the periodic introduction of fires. We as a country still need to do more though. Our social and managerial culture must change. If we ignore the wildfire paradox then the future of Wildfire management in the US will just incur more resources and lives.

"Changing responses to unplanned ignitions provides a largely untapped but important, if not essential, opportunity to restore landscape conditions and reduce future risk. Effectuating this change in fire manager behavior is challenging because ambiguity and incomplete information surround issues of responder safety, suppression effectiveness, and performance

measurement. We propose that by more rigorously researching suppression actions and refocusing on evidence rather than intuition as the basis for management decisions, the US Forest Service could better understand and improve the quality of its management operations. By capitalizing on recent advances in risk management acumen and capacity, the US Forest Service and the broader fire management community can achieve a vision for fire management in the 21st century where decisions and actions are risk-informed, evidence-based, enriched with analytics, and aligned with long-term objectives.” Excerpt from article co-authored by Matthew Thompson (Rethinking the Wildland Fire Management System - Society of American Foresters)

Key Themes of Systems Thinking	Conceptual Representations for Fire Context
<p>Systems as defined by parts, their interrelationships, and their purposes</p> <p>Any one part can hinder desired functioning of entire system</p> <p>Human decisions and their interactions with social and natural systems <i>(Examples: fire response decisions; community support for alternative response strategies)</i></p> <p>Conflicting purposes, priorities, policies, norms <i>(Examples: fire response objectives across federal and state ownerships)</i></p> <p>Functionality, hierarchy, and subsystems <i>(Examples: roles and responsibilities of land management agencies and the incident command system; incident command organizational chart including operations, planning, and logistics sections)</i></p>	<p>Simplified Model of Coupled Human and Natural Fire-Prone System <i>Mapped to three goals of the National Cohesive Wildland Fire Management Strategy (https://www.forestsandrangelands.gov/strategy/)</i></p> 
<p>System behavior over time <i>(Examples: perpetuating rapid emergency response; increasing forest density, fuel loads, and crown fire potential)</i></p> <p>Feedback loops <i>(Examples: natural fire regime as a balancing loop where behavior is relatively stable; fire exclusion as a reinforcing loop where aggressive suppression may over time lead to higher fuels loads, greater resistance to control, more damages, and greater demand for aggressive suppression)</i></p> <p>Unintended consequences <i>(Examples: stressed ecosystems, threatened communities, and increased risk to responders)</i></p>	<p>Simplified Model of the "Fire Paradox"</p> 

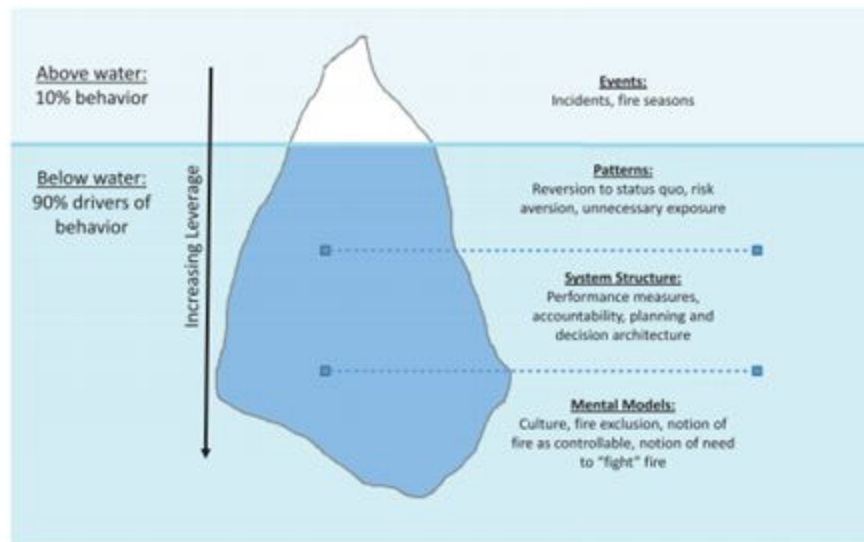


Figure 2. "Iceberg" model applied to fire management system behavior (modified from Thompson et al. 2017b).

How wildfires are currently handed - Laws and Entities that Deal with it (Hodey Johns)

(USDA) “policy began to be questioned in the 1960s, when it was realized that no new giant sequoia had grown in the forests of California, because fire is an essential part of their life cycle.”

As a result, official policy changed from preventing wildfires to expecting them and then containing them because it was ecologically healthy. In spite of this official policy, money spent towards preventing wildfires was never reduced (Smokey the Bear is still responsible for millions of taxpayer dollars). The USDA actually removed its own study about sequoias and wildfires from its website, likely to keep the money flow for these activities while hiding how these funds are supposed to be spent from the public.

Let’s take a look at how the U.S. Forest Service, the entity in charge of handling wildfires, is doing:

Since modern ecological policy on wildfires changed, there have been many major fires (and this was, as we stated, predicted). However, the loss of valuable land and human lives were not part of the plan. In the official reports in 2003, Federal Wildland Fire Management said that all major cases needed “needing strengthening and improvement” even by their own standards.

(USDA) “Since 2000, for example, at least 13 States have had their largest fires on record, and some have had their records broken more than once. Forest Service scientists predict that fire seasons could return to levels not seen since the 1940s, reaching 12 to 15 million acres annually.”

Instead of citing their own incompetence or making any significant changes, the Forest Service actually released these words in their budgetary analysis (2017). So, for them, more money will help alleviate the problem

instead of changing tactics.

At the crux of incompetence, in 2017, the U.S. Forest Service requested and received money in order to take “actions range from fostering resilient ecosystems by restoring the natural role of wildland fire as an ecological process” (those are their words).

Yet, in the spending report, they did not spend a single cent on controlled burns or thinning out trees (link in the show notes, the quote and budget are, I am not even kidding, in the exact same report). Their own analysis established that wildfires are actually a natural part of the ecosystem, so it's better to thin out forests and do controlled burns when areas become too risky, so they acknowledge that fact but have taken none of their own advice. The majority of the \$4.9 billion set aside for suppressing fires spent is on payroll, commissioning helicopters, and establishing water tanks in remote areas; methods used for when there's already a disaster, not limiting the fire in any way. In fact, there's more money spent on planting more trees than removing any, which, while philanthropic, makes them actually more responsible for causing fires than actually preventing or reducing the damage of fires.

Currently, the U.S. Forest Service has switched hands from the EPA to the USDA. (USDA) It has 10,000 permanent and full-time wildfire firefighters, but the majority of the work is still shouldered by county fire departments, volunteers, and prisoners when one breaks out.

Learning no lessons from the South Canyon Fire, it shouldn't be a surprise that the wildfire in California is as bad as it is, though I must remind you that California (with the sequoias) was actually the state used in the studies that said we should expect wildfires and contain them. However, we invested only in trying to prevent what was determined to be unpreventable. As a result, as it stands, (ABC and CNN) 84 people are dead and 560 more are unaccounted for. The fire is 95% contained (as of

November 24th), but this number went from less than 1% containment to 95% containment because “Rain helped extinguish [the] deadly wildfire”. One has to wonder how the \$4.9 billion taxpayers spend to prevent these fires had to stand and spectate while the rain was what actually fixed our problems.

Perhaps they are too busy finding survivors and providing medical care? Oh no, that’s being done by 800 Californian volunteers (CBS).

(CNBC) “California is paying inmates \$1 an hour to fight wildfires.” This money will go to pay for their own incarceration and won’t actually be earned, but the state has considered possibly offering time off of their sentence if they don’t die. According to the California Department of Corrections Twitter Account, there are over 2,000 felons fighting the fire and all were pre-screened to assure us of two things: The first is that they are not a danger to the public, not a flight risk, and ready to rejoin society (In which case... why are they in there?). The second is that their crimes were victimless. Don’t be surprised they could find 2,000 of them (Mic) “Victimless crimes are 86% of the... prison population.” In what could be the cruelest twist, in California, people with a prior felony may NOT be employed as firefighters. (USA Today) “Despite fighting California's largest fires, inmates are denied licenses they need to become firefighters after they get out.”

In Summation, Alison Berry of the Property and Environment Research Center writes:

For most of the 20th century, U.S. federal fire policy focused on suppressing all fires on national forests. The goal was to protect timber resources and rural communities, but this policy ignored the ecological importance of fire. North American forests have evolved with fire for

thousands of years. Fire returns nutrients to soils, encourages growth of older fire-resistant trees, and promotes establishment of seedlings.

Decades of fire exclusion have produced uncharacteristically dense forests in many areas. Some forests, which previously burned lightly every 15-30 years, are now choked with vegetation. If ignited, these forests erupt into conflagrations of much higher intensity than historic levels. Grasses, shrubs, and saplings in the understory now form a fuel ladder, through which flames can climb to the forest canopy, killing entire forest stands.

The fire problem is exacerbated by decreasing federal timber harvests since the late 1980s. In the absence of fire, and with reduced timber harvests and thinning, numerous small diameter trees have proliferated. Stressed trees compete for scarce water, sunlight, and growing space.

<http://www.perc.org/>

Can it be done better privately? (Zach Ripple)

Can our fire services, more specifically; wildland fire fighting services be sourced to private companies? The answer is yes, in-fact it is already being done and throughout much of modern history firefighting has been done privately.

In medieval France, what was known as the *guet-bourgeois* or *bourgeoisie* watch was established to watch over Paris, separate from the King's personal watch service; This service was established by private residents. *Bourgeoisie* watches took on the responsibilities of fire protection and security. It is likely that since very few people owned property of their own at the time, much less lived in the city at all, that these services were mainly utilized by elite merchants and craft guilds. Eventually as time went on and more people moved into the city, these decentralized security/fire services began to falter. King Charles IX disbanded the private resident watch services and the King's Watch took over these responsibilities.

In the 17th Century, we see the birth of insurance companies. London, which had been destroyed 4 times by fires, the most recent occasion being the fire of 1666 was very aware of the risk. Since risk assessment is the modus operandi of the insurance industry, these companies began establishing private fire brigades for their clients. The private fire brigades would only put out flames at buildings insured by the company; which would be marked in some way or another. Looking at American History, we can draw parallels. Fire-fighting was done privately in major U.S cities throughout the 1800s but functioned slightly differently than that of the U.K. Instead of being designated to fight fires by a particular insurance company, the first fire brigade to arrive on scene was the fire brigade that got paid by insurance. This led to obvious problems and corruption.

Picture the scene in Gangs of New York, where the fire brigades are brawling with each other as the building burns down in the background.

Fast forward to today: During the 2018 Campfires in California, Rapper Kanye West made headlines for hiring a private fire service to protect his neighborhood, which they carried out successfully. Meanwhile, state forestry services are at a breaking point. The recent fire seasons have been particularly brutal and California's budget is still recouping and not getting any bigger. If it weren't for the private fire services hired by Kanye, he and his neighbors would undoubtedly have lost their homes.

The private fire-crews hired by Kanye are actually on the payroll of his insurance company, similarly to how it worked in 17th century England, They are included in a package that guarantees they will protect a home or building in the event of a fire; In this case wildland fires. These companies subcontract the firecrews, instead of them being directly employed. For instance: AIG's "Wildland protection unit" uses the Montana company Wildfire Defense Systems, which protects almost 1,000 homes. **Like Blackwater, but for Fires?**

Private firefighting has received much criticism, especially in the wake of the recent wildfires, many critics stating the “Firefighting is a public good, not a commodity!!!!!!!BKG<JH!U” but the let's look at the bigger picture. The population of California is growing to the point where there aren't enough places for people to live and meanwhile wildfires are getting worse every year. In Spite of the growing population, there simply aren't enough wildland firefighters to go around, the existing crews are spread thin and under budgetary constraint. If the “public good” which is fire services is unable to live up to its name, shouldn't people be able to seek a better alternative?

Private Land Also makes a difference:

Consider the fact that in the American South, which is much more heavily forested than California, such fires are unheard of. Might this have something to do with the percentage of land in each region that is publicly owned and managed compared to the land that is privately owned and managed?

When land is privately owned, owners have strong incentives to maintain its long-term value. In the South, this means that owners monitor their land for concentrations of deadwood that could spark fires. Especially during dry seasons, controlled burns are very common in the South as the buildup of tinder and other forms of fuel are eliminated so they are less susceptible to lightning strikes or other events that could cause them to burn out of control.

These landowners are acting in their self-interest, because any fire that gets out of control affects their own pocketbook. But in acting in their own self-interest, they willingly perform actions that serve the social interest too.

This is what's lacking in California, and indeed, all the western states in which a vast majority of the land is owned and managed by federal and

state government. When this happens, the de facto caretakers of the land are state and federal wildlife employees, to say nothing of the U.S. Forest Service bureaucrats, who just don't have the same incentives to manage land as carefully as private owners. They don't own the land. They stand to receive no significant benefit from its being well managed. If they poorly manage it and let fuel build up to unsafe levels, they still keep their jobs. When wildfires break out, the perverse benefit these bureaus receive is increased funding and budgets.

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