

2015 Washington Brush and Timber Fires

Executive Summary

Washington State is a scenic wonderland that features a multitude of natural environments. It touches the eastern part of the Pacific Ocean and reaches inland to the mountains. It's location on the continent provided one of the state's most devastating fires to date. This project takes a look at some of the key conditions that caused millions of dollars in damages, burned of a million acres, and took the lives of three firefighters. The conditions examined range from the climate leading up to the fires, invasive plants and insects, and how fires are fought and prevented. This project will also look at the how the budget works when it comes to paying for these fires.

Introduction

Fire can be beneficial to the environment and it can also be hazardous. In 2015, Washington experienced one of the costliest wildfires in recent history. Last year's fire had multiple contributing factors that cannot be over looked (DNR, 2015). In the event of future fires, if these factors can be minimized then it should not be as costly. This paper will look at the contributing factors, the fire's toll, the economic impact the fire has, and estimated costs in the future. Due to climate change, the predictability of wildfires has changed and has become

inconsistent with historical data, and has reshaped the way fighting fires are fought and are paid for.

Contributing Factors to the 2015 Washington Wildfires

The contributing factors going into 2015 was the warm winter coming out of 2014, invasive plant and invasive insect life, and how controlled burns are handled. I have looked at the weather patterns beginning at the end of 2014 until the late spring of 2015. From the resulting weather conditions, I looked at what that did to native and invasive species of plant life and what that did as far as adding more fuel to potential fires. The other contributing factor I looked at was the invasive or problematic potential invasive insects had on the surrounding environment since the weather had made the condition right for a large fire to spread. These factors coupled with years of prescribed burns lead to one of the regions costliest fires to date known as the Okanogan Complex.

El Nino and La Nina

One of the major contributing factors to the fires in 2015 was the weather. The average temperatures from January to May was well above freezing ranging from 40.5 to 48.9 degrees Fahrenheit across the state (NOAA, 2015). The cause of this was how La Nina affected our region. It caused the region to be warmer than usual and there was little to no precipitation in the state.

El Nino and La Nina is the weather patterns that occurs over the Pacific Ocean that can affect how weather behaves globally. El Nino is when the winds blowing east to west weaken

and the winds west to east pick up. The warmer tropical surface waters of the western Pacific are blown easterly, reducing cold upwelling off the western coast of South America. This affected the country by leaving us with a drier and warmer than average winter. La Nina is the opposite. When that occurs the trade winds push the warm surface water temperatures westward and causing the Pacific Northwest to have cooler weather and more precipitation (NOAA, 2015).

The land was in during the period in which the fires started, the region was warmer and drier than average. Based on those conditions, the winter was warmer and dryer than normal. These conditions prevented any snowpack from building up, a kind of natural reservoir. Instead of heavy snowfall to gradually melt to fill streams and rivers, rain fell and was not able to be stored for the next few months. By May, according to NASA's findings Washington had only 16 percent of normal average snowpack and the watersheds were predicted to be below 75 percent capacity.

Since these La Nina conditions existed throughout the spring and summer, it was warmer than the century average, the landscape was drier due to the lack of melting snow. This left for a host of other conditions to set the region up to have the worst fires to date. The trees and root systems in the region were drier, the invasive plant life, insect life and underbrush that should have died during the winter was still around. Of the plants and various underbrush that dried as the season progressed added to the amount of potential that can burn out of control.

Last year was not a good year as far as La Nina conditions go based on the ONI (Oceanic Nino Index). The Pacific Northwest was left drier and warmer ideal for droughts and fires. The rest of the country saw other extreme weather occurrences like heavy rain and flooding. Currently, as a species in a society, we have the potential to make future climate systems worse and even more unpredictable. With our own greenhouse emissions being added to what is naturally occurring, larger portions of the oceans' surface temperature could be effected and potentially worsening our own weather. Since these weather systems can help contribute to natural fires, our own warming of the planet has the potential to make fires worse.

Invasive Plants and Insects

The next major contributing factor to the intense fire activity in 2015 was the abundance of invasive plant life and insect life to the affected regions of Washington. These plants can add to the volatility of a fire as extra fuel during dry conditions. Invasive insects can have the potential to damage or kill whole trees and adding extra hours of burn time to a fire by causing one lone tree or a group of trees to be drier, causing it to burn easier. There are many examples of what species are harmful to the indigenous ecosystem by displacing habitats or how they consume plants, but there are a few that have been more prevalent in Washington that contributed to the fire.

Invasive plants are species that did not originate in a particular region but are moved by humans from another. They manage to thrive and push out native species causing detrimental harm to the environment of that area. Federally they are known as "noxious weeds" and are monitored or controlled with a number of means that may or may not have drawbacks. The

most prevalent of these weeds is scotch broom, various thistle, and knapweed. These are the most common I know I have seen. It is easier for these plant species to inhabit areas that have been prone to drought and other disturbances to soil composition. Due to the drier, warmer conditions, this created drier, more abundant kindling for areas that did not experience the residual moisture from the melting snowpack compared to recent history. Since the region had such a warm winter, many invasive species had more chances to spread and grow undeterred. You can see parts of the affected areas with remnants of these weeds because of the slow rate of decomposition that these plants have.

Invasive insects can have a just as much of an impact on plants. These populations can generally be located in specific regions of the country or world but can also be introduced under harmless instances. With warmer climate, these insect ranges have expanded into areas that used to be unsuitable. Since it is warmer and drier, their destructiveness can be unimpeded versus when plants and trees have the proper moisture content. These drier, more stressed trees have given certain bark beetles the impression it is ideal for inhabiting.

An example of these influential, yet destructive, insects is the variety of bark beetles that can be found inhabiting our part of the country. There are hundreds of species of bark beetles that is primarily found on dead, weakened, or dying trees. Given the warmer season, large populations of beetles were not killed off from the winter and as the seasons went on the beetles experienced a population explosion. Among the most common culprits that damages whole populations of trees are the mountain pine beetle. Increased mortality in spruce, lodgepole, pinyon-juniper, and ponderosa forests has increased in the last few years. The

mountain pine beetle's ideal conditions for them to thrive is when trees experience stress from less water content and increased temperatures.

The human controls set for these invasive species plants and insects can be good or bad. These measures can be slow and laborious or they can be extremely effective with harmful drawbacks. In the case of the invasive plants like scotch broom, it is either handled with pulling or fire. Some invasive species are treated with the introduction of insects that eat at those specific plants. Introduction of additional insect species may potentially have an adverse effect in the future. Chemical means can also be used to get rid of these plants but pose additional risk to the surrounding environment. It can have the potential to harm local wildlife and cause the excess chemicals to runoff to nearby water supplies. In the case of the bark beetles, it is difficult to handle their situation. The majority of the time the trees that they inhabit are in protected areas and disposal of the beetles can be a delicate matter. It would take careful coordination to get equipment into the forest and remove the exact trees they inhabit. Depending on the state of the tree or trees, removing the areas or limbs the beetles have infested would be the priority. If the whole tree is affected, then the whole tree could be cut. After the tree or parts of the tree is down, it is then chopped up and will be incinerated.

Invasive plants and insects have a role in a fire's intensity. They are force multipliers that only adds more flammable fuel when conditions are ideal. The sizeable area of growth "noxious weeds" can cover and also the addition of hundreds of burn hours (a rating based on a tree or plant's thickness that contributes to how long that item is speculated to burn) a tree can be rated after it has been killed by beetles will result in thousands of acres that can burn like

tissue. The continued unpredictability of the climate is only adding to the danger and can make fighting fires a lengthy process.

Prescribed Burns

Wild brush and timber fire has always been a natural part of an ecosystem. It is nature's way of reintroducing vital nutrients back into the ground and clearing the way for new life native to those parts. The early 1900's began decades of a fire suppression policy in order to preserve natural resources. This policy left acres of unburnt fuel lying around and the realization that some environments would benefit from a fire. Since then the Bureau of Land Management (BLM) in collaboration with local departments, have started using fire as a tool in the form of prescribed burns or controlled burns. These fires are set to ensure that fires are not uncharacteristically large due to hazardous fuels laying around and it also assists the environment in resetting by helping forests recover from fires faster.

When The Department of Natural Resources and BLM sets fires, they have a few goals to be considered a success. These fires reduce the amount of surface and ladder fuels, helps promote native species growth, and it can serve as practice for the event of a larger fire. Surface fuels are "vegetative fuel on or near the ground surface, consisting of leaf and needle litter, grass, dead branch material, downed logs, bark, tree cones and low grown vegetation." Ladder fuels are similar but consist primarily of small trees and shrubs with their flames having the ability to reach the canopy. These burns also help promote the growth and the continuation of native species. When areas of land are becoming less indigenous, a fire plan is set in place to restore the land. As these fire plans start to unfold, many agencies work in

conjunction before anything is lit, from the Department of the Interior to various weather tracking agencies for smoke tracking. One of the last reasons why some of these fires are set is that it also helps assess and update procedures when handling a fire. The experience gained from these fires help fire fighters and volunteers effectively and safely handle unplanned and future fires.

As time has progressed especially since the 2000's, the frequency of handling these fires became more erratic. Climate change, introduction of invasive species, and land development has manipulated the way these fires are handled. When land is being developed, a lot of times these disturbances in the soil make the land more susceptible to the introduction of invasive species. Those instances can be overlooked at times and can cause invasive growth to occur. The burning itself can be detrimental and leave possible future fuels lying around. Especially in areas where manpower was limited and the disposal of burnt materials was not cleared. After these fires, emphasis should be placed on the reseeding, if possible, of native species to restore the balance of the ecosystem.

Based on my experience, I did see the need for these fires. At the same time, I also see the need to constantly check the affected areas and to ensure that only native species return. I know the expended fuel from burnt trees is disposed of, but at times when these fires have spread, the crews fighting them have spread out and thinned leaving large distances between teams and spreading them out thin over the front of a fire. These thinned out crews usually consist of ten to twelve member crews on that have been on and off at least twelve hour shifts. After days and weeks of laborious monotonous work, somethings can fall to the wayside

depending how “on their toes” the crew boss is for any team. That was my experience and similar to the experiences of my friends out on the fire.

Putting it all Together

The weather systems influencing regional climates, invasive species, and prescribed burns each have their own ways of contributing to large disastrous fires. No one component is less important than the other as a factor. So when you put it all together, 2015 made the conditions perfect for a large fire. For me, prior to helping fight the fires, I did not see how these factors could play into a major fire. I assumed since it was hot and dry, it would be easier to burn.

The weather system decreased the snow pack to nonexistent levels, causing virtually no snow melt to feed the forests. The unusually warm winter ensured the unhindered growth of native and invasive underbrush to continue growing without the natural system check of winter. As the season progressed and became hotter and dryer, some of these brushes, like scotch broom, can have flames reach the canopies of trees and some of these canopies may be drier than usual due to an infestation of bark beetles. The spaces between wooded areas would have seen grasses like drooping brome or cheat grass that can burn like paper across open fields and into neighboring wooded areas. Based on how the affected areas had handled previous fires and the course of actions that were taken after those fires, it could have contributed to last year’s fires. It’s really hard to put any blame on the crews or teams that had

to assess whether all the materials were disposed of or if the land was properly reseeded to prevent the encroachment of invasive species.

It can all be connected. As we continue warming the planet, these condition will worsen. The fire personnel who have been handling wildland fires for over a decade, mentioned that there is no season for it anymore. For them, it would be a late spring to summer gigs, sometimes into the early fall. These fires are fought from the Southwest, following the mountains north westerly towards the coast, and finally fighting fires in the Pacific Northwest and Alaska. To them, fighting fires and volunteering for these incidents is becoming year-around. The majority of the fire fighters I trained and fought with, agree climate change plays a major role.

The Fires Toll

The total land burnt during the Okanogan Complex and other fires in the region was over a million acres which is a staggering amount. It had burned large chunks of land in multiple locations. Some locations had a significant amount of people that had to be relocated for their own safety. Not only did the fire take a physical toll on the land, but it also took its toll on the people. As mentioned, it did displace some residents temporarily, but there were thousands of people volunteering their time and collective effort to contain the fires. It was an effort that involved the federal government all the way down to state and local officials. Other countries even sent volunteers to fight the fires.

How much land burned last year in Washington? With the three major fires revolving around the Okanogan Complex, North Star, Tunk Block, Lime Belt and other smaller complexes

around the state, the combined acreage burned was just over a million. Most of the acreage is considered wilderness. Washington has just over 4.5 million acres of wilderness and a quarter of it burned. Those fires last year were started by lightning strikes with no rain to follow. Since it was exceptionally dry last year it only meant disaster for the forests. The toll on people is a hard number to swallow. For starters there were the three firefighters that perished near Twisp, WA. There were countless others that were injured from smoke and exposure to heat related symptoms. As the state burned it took thousands of people to help contain it. It involved some two hundred pairs of hands from the active U.S. Army, over 500 Washington State Army and Air National Guardsman, and many state and local fire agencies. There were also out of state contracted teams fighting the fires. Other countries like Canada, Australia, and New Zealand had also sent volunteers.

It was a monumental effort from everyone involved. A lot of these crews would be out on the lines for at least twelve hour shifts that can go up to 4-8 additional hours depending on the weather conditions. In addition to securing the fire lines, some crews are charged with making a safe path for people to escape the fire and also trying to prevent their homes from burning by clearing any possible fuels around homes that can assist the flames from spreading into towns.

I had experience in both fighting on the lines digging trenches and had a hand in making sure people had a safe way out. Both have their drawbacks and takes a solid toll on everyone involved.

The Economic Impact of the Fires

Everything has a cost. When dealing with the environment and public safety, there are funds for these occasions. This allocation of funds is used for man power, supplies, and efforts to restore what was lost. Over the years, the state and the rest of the west coast has seen budget cuts for these natural disasters and “fire borrowing” has become more prevalent. “Fire Borrowing” is when the money allocated to fight fires and help manage land is exhausted and other programs get cut or squeezed to make up the difference. These fires last year have a significant impact on funding in the future.

2015 Fire Budget and Beyond

Just for Washington alone, the state spent \$137 million in response to the fires. Last year’s budget was \$79 million to help offset the previous year’s fires. If the cost of the fires is more than the budgeted amount, then a request for a supplemental budget ranging from \$15-\$48 million can be made. Even in the perfect world, with the supplemental funds, there is still \$10 million dollars that can be borrowed from another program in the state to cover the \$137 million bill from last year.

So with the astronomical amounts of money being thrown at a problem that is becoming more unpredictable, there are small strides being made in the state legislature.

Peter Goldmark, the Commissioner of Public Lands, said in an interview:

“It is important for people to understand that we are seeing a change in the weather pattern and getting into a more drought-y situation in Western Washington. The fire conditions are changing, and that makes it imperative that we get the fires out when they are small.”

Goldmark has proposed \$24.3 million per biennium. This is in addition to the current budget.

These funds are for:

- \$6.3 million for thinning forests and removing dead trees that serve as explosive fuel and also for wildfire prevention education. Fall would have been a good time to do much of this work.
- About \$3.2 million would place additional experienced firefighters on the ground in key places around the state. This could get the best talent out to fires within minutes or hours rather than days.
- About \$6.1 million would help local fire districts modernize and improve equipment.
- \$6.95 million would cover joint training among DNR crews, local fire districts, tribal firefighters, Washington National Guard soldiers, independent contractors and even the Army.
- \$1.2 million for better communications gear, including radios.
- \$443,000 for helicopters and airplanes. Additionally, Goldmark says innovations such as using drones to dump water in places where planes can't fly — for lack of visibility — need to be explored.

I find that we, as the public have to understand the money spent now should curb future costs in fire suppression. The initial costs may take away from other state funded programs, but with the years to come most of the cost should be for maintenance. If the cost of the next major fire exceeds expectations, then the end bill should not be as high.

Conclusion

Due to climate change, the predictability of wildfires has changed and has become inconsistent with historical data, and has reshaped the way fighting fires are fought and are paid for. These fires and their predictability is largely influenced what is growing in those volatile areas. The impact man has made on climate has adversely affected and changed the environment and increased the volatility of any given area. In this paper we looked at the

evidence from the weather patterns changing on our planet. El Nino and La Nina will continue to impact water availability around the world. This in turn influences the life cycles of plants and insects alike both indigenous and introduced. Since these fires are burning longer and unpredictably, we try different techniques to reduce the following year's severity. Not only do these fires affect the environment and the local populations around them physically, they affect the state budgets. To allocate the funds, some government programs will take a hit more than others. After all this I have come to the conclusion that as a society, we have to be more vigilant, aware, and be ready to sacrifice some comforts because when something as pressing as a natural disaster arises, there's a possibility it is our fault and we must do our part to take responsibility.

Resources

http://www.esrl.noaa.gov/gmd/outreach/faq_cat-1.html

http://www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml

Author: Emily Becker Thursday, September 10, 2015 <https://www.climate.gov/news-features/blogs/enso/september-2015-el-ni%C3%B1o-update-and-qa>

<http://earthobservatory.nasa.gov/IOTD/view.php?id=85887>

http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=86051&eocn=image&eoci=related_image

<http://www.fs.fed.us/research/invasive-species/insects/bark-beetle/>

http://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=fsbdev2_027237

<http://www.nwcb.wa.gov/mapping.html>

<http://plants.usda.gov/java/noxious?rptType=State&statefips=53>

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7421.html>

http://www.blm.gov/wo/st/en/info/history/sidebars/fire/invasive_species_alter.html

http://www.blm.gov/or/resources/fire/prescribedburns/burn_bkgrnd.php

http://www.blm.gov/or/resources/fire/prescribedburns/burn_bkgrnd.php

http://www.blm.gov/wo/st/en/info/history/sidebars/fire/invasive_species_alter.html

<http://inciweb.nwcg.gov/incident/4613/>

<http://www.nfpa.org/newsandpublications/nfpa-journal/2015/november-december-2015/features/the-year-in-wildfire>

<http://www.nwccinfo.blogspot.com/2015/10/10212015-orwa-statistics-9302015.html>

<http://www.wilderness.net/NWPS/chartResults?chartType=AcreageByStateMost>

http://www.nytimes.com/2015/08/21/us/3-firefighters-die-in-crash-on-way-to-washington-state-blaze.html?_r=4

<http://invw.org/2015/05/02/legislature-poised-to-cut-firefighting-budget-despite-drought-threat/>

<http://www.governor.wa.gov/sites/default/files/2015-17OperatingBudgetHighlights.pdf>

<http://www.theolympian.com/opinion/editorials/article43580721.html>

