Oregon State University

FOR 431 Policy Brief
Spring 2021

Policy Changes to Implement More Prescribed Fire in the Pacific Northwest

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Executive Summary:

The topic of this policy brief is to implement more prescribed fires in the Pacific Northwest (PNW). Due to a century of fire suppression and the decades of Smokey Bear telling the public, "Only you can prevent forest fires," the public in the PNW affiliates fires in forests as a devastating occurrence. The motivation for more prescribed fires is to reduce fuel loads, create fire breaks, reintroduce fire to ecosystems adapted to fire, and reduce the risk of catastrophic wildfire. This paper covers more of this growing problem as well as several potential solutions. These solutions would include using more prescribed burning, securing fuels reduction funding, looser air quality restrictions around prescribed fire, and lastly, continued wildfire education. Once fire managers are able to get the relief and support, they need we can expect to see larger fuels reduction efforts, more prescribed burning, and more prepared citizens.

CONTEXT:

Today we are seeing the catastrophic effects of severe wildfires in the pacific northwest, and the pressure is being heavily put onto land managers to suppress and prevent these incidents. Science has proven that fuel reduction methods such as prescribed burning and thinning can reduce wildfire severity and intensity. Prescribed burning is a method of purposely igniting an area of land on fire by trained wildland fire crews during cool, desirable conditions to make the fire as controllable as possible. Prescribed fire is a low-intensity fire that creeps along the forest floor and consumes the understory fuels, reducing the fuel load. These fuels are any type of vegetation or material that can give a fire something to burn, such as shrubs, pine needles, leaf litter, grasses, etc. In the case that a fire was to start moving towards a section of land that had been previously burned by prescribed fire, the fire would not have much available fuel to consume. The lack of fuels would cause the fire to decrease its intensity or halt the progression forward, making it easier for crews to suppress the fire.

Figure 1: Wildland firefighter uses drip torch to begin a low-intensity prescribed burn. Photo from Pixabay.com (photographer unknown).

Incorporating management techniques such as prescribed fire and thinning also has a positive effect on the overall ecosystem in terms of wildlife habitat, natural fire regimes, diverse and healthy vegetation growth, and cleaner smoke as opposed to wildfire smoke. Using prescribed fire can be one of the most effective tools for fire prevention by incorporating fire into a landscape that hasn't experienced fire for a long period of time and keeping it actively in the ecosystem.

Fire managers must follow a set of strict air quality regulations in order to implement a prescribed burn. These regulations limit the amount of smoke allowed to be produced and minimize the amount that flows into

communities. These burns generally burn "cleaner" because the fire is typically a slow, creeping fire that remains below the canopy, thus burning sticks and shrubs instead of torching mature trees. When a stand-replacing fire occurs, all types within the ecosystem are vastly being consumed in large amounts, leading to a "dirtier" more toxic smoke emitted into the atmosphere. These are just a few of the numerous reasons that fuel reduction techniques are an adequate method for wildfire prevention. Unfortunately, far too few of these practices are being done to keep up with the increasing annual large-scale fire events. In figure 1 it can be seen that prescribed burning is still being done regardless of the obstacles burning presents. The U.S. Forest Service takes the lead in most acres burned annually, but these are just a small fraction of the 193 million acres of land that the agency manages (USFS, n.d). Additionally, the BLM has the most land to manage nationally, at approximately 1/10th of America's land base (245 million acres), yet they are burning the lowest number of acres of them all (BLM, n.d). Ultimately, burning just over one million acres per year is only the slightest portion of government lands, and in order to make an impact in fire preventative efforts, the number of acres burned annually needs to increase substantially.

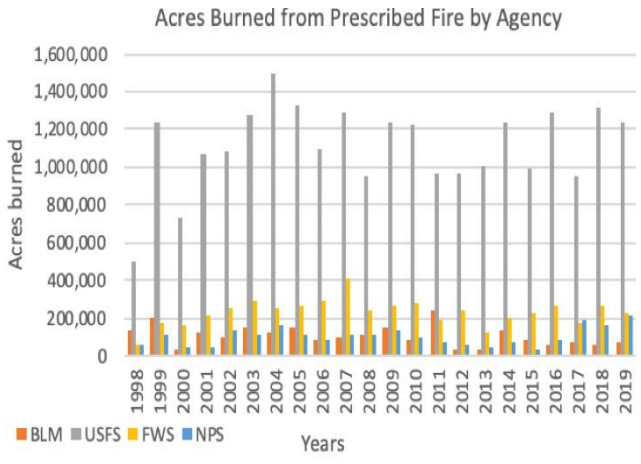

Figure 2: show the number of acres the Bureau of Land Management (BLM), U.S. Forest Service (USFS), Fish and Wildlife Service (FWS), and National Park Service (NPS) used prescribed fire to reduce the hazardous fuels. **Source**: National Interagency Fire Center (NIFC) (NIFC, 2019).

Current Issue

The majority of our forested lands in the pacific northwest are public lands managed by agencies such as the U.S. Forest Service, Bureau of Land Management (BLM), and the state. Although managers know of these effective fuel reduction methods, and some wish to implement them, land management policies can prevent agencies or private landowners from taking action. Examples of these issues are government budgeting, lack of public support, and air quality regulations. Wildfire suppression is an extremely expensive cost for managers to pay between personnel, equipment, air support, etc. Land management agencies are given a set budget for each calendar year to use for a broad spectrum of practices. Unfortunately, our recent wildfire events are consuming most of this budget to suppress the fires, leaving a small portion of funds remaining for fuel reduction. For this upcoming fire season, "The USDA predicted that fighting wildfires would have accounted for up to two-thirds of the Forest Service budget by fiscal year 2021" (Clavet, 2018). Additionally, this 2021 fire season is geared towards being more catastrophic than what we have seen the last few years. This tells us that a new wildfire suppression and prevention policy needs to be put in place because, with our current policy, we will only see more homes and property lost.

After 75 years of Smokey Bear engraving the idea that fires in the forest need to be prevented, the public sees all fires in the forest as bad fire. Government agencies are for the people, so when the people disapprove of specific management tactics, it restricts the agencies from fully carrying out their plans, such as fuel reductions. This is why it is critical to implement a new approach to properly educate the fundamentals of prescribed fire so that managers can start implementing more fire into forests of the PNW.

Lastly, the regulations pertaining to air quality standards for prescribed fires have been far too strict. In the past, a zero-tolerance policy for smoke entering communities was enforced, preventing prescribed burns from occurring in needed areas, like in the wildland urban interface (WUI). In 2019, Oregon approved a policy change that will allow small amounts of smoke to enter communities for a short amount of time. While this is an excellent move in the right

direction, there still needs to be a further policy change that exempts air quality rules from prescribed burns. In the long run, withstanding a short period of smoke in communities from a controlled burn is better for the environment as opposed to a large-scale fire.

POLICY ALTERNATIVES:

Policy Action I

Action through policy needs to be taken to save the cherished items, commodities, and ecosystems, and there are a few ways it can be done. One action that the public has strong feelings for and against is implementation for prescribed fire. Regardless of the public's opinions, fuels are building up, and action needs to be taken to reduce those fuels to protect our valued possessions, resources, and lives. This policy would entail increasing the number of acres burned through prescribed fire, securing more funds for prescribed fire projects, lobbying for reducing air quality standards, and educating the public on the benefits of prescribed fire.

Pros to Implementing More Prescribed Fire:

Prescribed fire was used in the PNW before the Euro Americans arrived by the Native Americans, meaning the land was adapted to their management techniques (Cagle, 2019). Removing fire from the land allowed alterations of species, composition, and densities to occur. Using prescribed fire is the natural way of returning the ecosystems to a similar structure and function before the management of the land was changed while also reducing the build-up of fuels. In addition to reducing fuels, prescribed fire can create fuel breaks and defensible spaces. This means that the fire will remove the fuels, so when a fire comes through, there will be limited fuel, likely making the burn significantly less destructive. Another reason why an increase in prescribed fires should be formed into policy is it is one of the most cost-effective ways of reducing fuels (Steelman & Burke, 2007). Depending upon the size of the fire, some prescribed fires can cost anywhere from $50 - $250 per acre (i.e., the larger the unit burned, the cheaper) (Chandler et al., n.d.). Since there is already a reduced budget for fuel reduction due to most of the money set aside for wildland fire, funding goes to fire suppression costs. Having an alternative way to reduce fuel that is cheap means more work can be done each year. Lastly, prescribed fire smoke is less hazardous than the unregulated smoke that is produced during a wildfire. With the current standards, people in the PNW, even with pre-existing conditions exacerbated by fire smoke, will be better off with prescribed fire smoke. The reason for this is due to the duration the smoke is allowed to be in communities and the less toxic smoke.

Cons to Implementing More Prescribed Fire

The most significant risk with prescribed fire is the risk of its escape and the potential aftermath. In the PNW, our society tends to associate fire with negative functionalities, and the positives are not seen or understood. It is understandable why the public tends to be apprehensive about using prescribed fires when they see wildfires causing homes, lives, and valued resources to be lost every fire season. Along with the fear of its destruction, prescribed fires have narrow windows when they can be implemented. Conditions have to be correct, including temperature, wind speed, relative humidity, and fuel moisture (Extension Foundation, 2020). On top of that, in one of the PNW states, Oregon, prescribed fires cannot emit fine particulate matter $PM_{2.5}$ for longer than 1 hour. $PM_{2.5}$ is harmful to humans; however, this standard is stricter than the federal air quality standards (Burns & Miller, 2020). These regulations are to help prevent fires from escaping and keeping the public healthy. Lastly, prescribed fire is not meant to be used everywhere. Some trees can handle a low to moderate prescribed fire while others cannot. The area next to homes like in the WUI or stand of trees with poor defenses against fire should strongly consider the best options to reduce fuel, which may not be prescribed fire due to the risk of burning homes and damaging trees.

Policy Action II

Another alternative policy to save the cherished items, commodities, and ecosystems is to promote thinning with mulching/chipping. This is

a way also to reduce the building up of fuels. Along with prescribed fire, there is also controversy over the use of thinning with mulching/chipping. This policy change would entail increasing the number of acres thinned, securing more funds for thinning projects, and educating the public on the benefits of thinning with mulching/chipping.

Pros to Thinning with Mulching/ Chipping

This type of fuel reduction does not require fire and won't risk escaping and burning your house down. This means that thinning can be done close to homes and or sensitive sites where fire would not be appropriate. Thinning down the density of trees changes the amount and distribution of the left fuels in the area (Hunter, 2007). With thinning, there is a variety of fuels that can be removed. Fuels can be in the crown, underneath the crowns (i.e., ladder fuels), and on the ground. Thinning's can remove the large trees leaving the younger trees, or remove the younger trees, leaving the larger older trees. When thinning a location depending upon the treatment, size of the trees, and their species, the thinning project could pay for itself or even make a profit. Thinnings also don't have to be readministered as frequently as prescribed fire. They only need to be conducted every 20 to 30 years depending on the stand species and the desired conditions (Agee & Lolley, 2006). With mulching/chipping, the fuels like ladder fuels and surface fuels that are not taken out through thinning can be broken down and spread around the site to help disperse the fuels and allow them to break down faster. Also, mulching and chipping tend to be fast work with moderate pricing of approximately $400 per acre (Chandler, n.d.). Another benefit to the mastication of fuels and them being spread around is suppressing dormant seeds reducing regeneration (Chandler, n.d.).

Cons to Thinning with Mulching/ Chipping

When it comes to the cost of a thinning operation, they tend to be much more expensive if a commercial thin is not possible. A thinning operation price can change based on accessibility and the number of trees removed per acre and can range from $250-$550 on easier ground and up to $10,000 on extremely rough terrain (Delgado, 2020). A thinning also tends to be done with larger machinery which can compact the soil. Soil compaction can take years to reverse and make it hard for trees and other plants to grow. Machinery that is used for thinning is limited to the terrain of the area harvested. Feller bunchers can work on the flat ground to about slopes of 40%, so timber hand fellers would have to be hired on any slope steeper (USDA Forest Service, 2021). Hand-felling timber can be extremely dangerous, and there is a limited number of people who do this job. Also, this type of fuel reduction leaves fuels on the ground from the thinning process and mulching/chipping and could still pose a threat if a fire came through. Lastly, one of the biggest cons to thinning and mulching is they are less like natural disturbance than prescribed fire.

Policy Action III

The last policy option would be to continue with the current policies we have now. There would be no change in the amount of fuel reduction projects, fuel reduction funding, or public education about the needs and benefits of fuel reduction methods.

Pros to No Action

A pro to no action is that agencies and other landowners would not need additional funding to implement more fuels reduction then what they currently do. This could alleviate the stress of making tough decisions by agencies/landowners to pick and choose where funding should be taken, from other management budget facets or where more funding might be acquired. This pro, however, does not provide a solution that would increase the reduction of fuel loads, leaving people, valuable resources, and property at risk of catastrophic wildfire events.

Cons to No Action

If no actions are taken to reduce fuels in the PNW, we will more than likely see a continuation in the trend of catastrophic wildfires see figure 2. Especially with climate change, the fuels will become drier, and could cause live trees and

plants to dry out as well. Since the fuels are getting drier earlier in the fire season, there is a much higher chance of each fire turning into a catastrophic wildfire. These high-intensity wildfires are much more likely to turn into stand-replacing fires, negatively impacting forest health for several decades. Many of these large megafires have disrupted more forest land than in past years, which have brought problems with erosion, soil health, and a lack of forest regeneration. We currently have projects to use some prescribed fire and thinning with mulching/ chipping, but in some areas of the PNW, that is not enough to make up over a century of fire suppression and fuel loading. Fire seasons are lasting longer than usual and suppression costs are adding up more than they have in the past, continuing to eat into other preventive programs budgets. Since the preventive programs are operating on less money each year, they cannot provide the services that the PNW forests desperately need. Managers will also continue to struggle to use prescribed fire as air quality restrictions will ultimately control when and where fire managers can put fire on the ground.

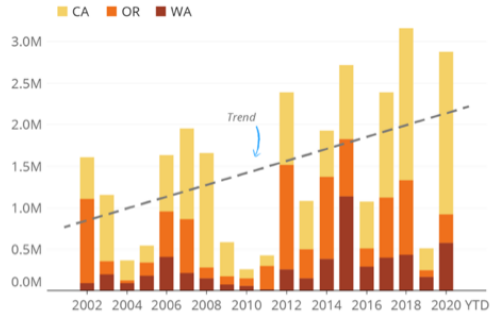

Figure 3: Shows the trend for the acres burned by wildland fire in California, Oregon, and Washington by the millions from 2002 to 2020.
Source: National Interagency Fire Center (NIFC) (Osaka, 2020).

POLICY RECOMMENDATION

For thousands of years, wildfire has been able to spread across the PNW as it wished. The arrival of Euro Americans and their introduction of fire suppression disrupted the delicate balance between fire suppression and letting fires burn. After more than a century, the forests of the PNW are primed and ready to burn. Fire managers are doing all they can to eliminate these excess fuels. Still, it is an uphill battle that is constantly fighting, funding issues, air quality restrictions, and a lack of understanding from the public. This policy aims at putting more fire on the ground, securing more funding, lessening air quality standards, and lastly, educating the public on the benefits of prescribed fire.

To start, the overall objective of this policy brief is to put more prescribed fire on the ground. Prescribed fire has been used for centuries by the Native Americans to maintain their land. Land that the Native Americans maintained was generally very healthy and regularly produced the resources needed to sustain their way of life (Cagle, 2019). The Native Americans knew how fire worked and used it to clear the land and provide safety during the summer months where naturally caused wildfires were present. Since the early settlers didn't understand fire, they stopped the Native Americans from using it. This ideology worked for the better part of a century, but now we know that total suppression will not work for our forests. The status of our current forest is unhealthy and packed full of fuels. These fuels make forests more at risk of wildfire and increase the potential to destroy the whole forest. The solution to this problem is to use more prescribed fire. When it is used correctly, prescribed fire can reduce fuel loads, naturally thin forest stands, reduce forest insects and disease, and enhance overall forest health. Fire managers are generally using prescribed fire to reduce catastrophic wildfire risk, but there are many other benefits that come with prescribed fire (Donovan & Brown, 2007). There are other ways to decrease fire risk, such as chipping and mulching, but these methods are generally more costly and are not feasible in mountainous areas. Prescribed fire is the best option because it's the cheapest, it's more natural, and it's ecologically more responsible than chipping and mulching.

In order to put more fire on the ground, there will need to be an increase in funding. There are several ways to award these types of programs more funding: allocating more of the federal budget to preventive treatments and separating the federal suppression budget from the fuel's reduction budget. First, Congress needs to appropriate more funds to both the United States Forest Service as well as the Department of the

Interior (DOI, 2021). With the additional funding, these agencies will be able to put more fire on the ground. In the case of the Department of the Interior, they will be able to allocate more money to each of the different agencies. These agencies will be able to use the money as they wish to use more prescribed fire. In addition to congress appropriating more funds to the different agencies, separate budgets will need to be constructed between wildfire suppression and prevention programs, including education and prescribed fire. Individual budgets are needed because each year, fire suppression takes money from the preventive program's budget due to wildfires getting larger and more expensive. This is a significant problem because suppression can eat up a large portion of these prevention program budgets, severely limiting their effectiveness and potential to make a real difference (CRS, 2017). When prevention programs have more money and separate budgets, there is a lot better chance that these programs can make a difference. More prescribed burning can reduce suppression costs in the future as they are doing the work of a wildfire but in a more manageable way.

One large problem that fire managers run into is dealing with the air quality restrictions set by the Department of Environmental Quality (DEQ). Over time these restrictions have lessened but are still not where they need to be (Burns, 2019). We're not saying that there shouldn't be any restriction on prescribed fire smoke but rather that there should be more allowable smoke in populated areas without any fines or penalties. Oftentimes, fire managers are forced to abort a project when the wind is not right. They could have waited all year for one opportunity just to have it ruined by the direction of the wind. Many factors go into planning a prescribed burn, and the wind direction is only one of them, but it's probably one of the most critical factors. Wind can drive the fire in different directions and ultimately blow the smoke into populated areas. Smoke may come from 50 or more miles away to communities unaware of the prescribed burn, worrying the general population. Most people would think of all smoke being created equal, but that's far from the truth. Smoke created from prescribed fire is not as unhealthy as the smoke created from a wildfire (Liu et al., 2017). Many people don't know the difference, and that's why we need education programs.

Lastly, education programs are needed to advise the general public on the benefits of prescribed fire. Since fire suppression has been pushed so heavily over the last century, it's been hard to convince people that some fire is beneficial to the land (Frederick, 2014). Much of the public's information on the effects of wildfire come from the media during catastrophic wildfires. This information is usually misinformed and reports on extreme fire behavior only. In reality, prescribed fire is nothing like a raging wildfire. In the wake of events over the last five years, it's easy to see that there has been a push in the right direction in terms of prescribed fire, but there are still many barriers to cross. Education should start in elementary school with information presented to the general public during the summer, spring, and especially in the fall when prescribed burning is most likely to occur in the PNW. When we look at prescribed burning in the south of the U.S., we can see that it's socially acceptable, but that's not so much the case in the PNW (Southern Group of State Foresters, 2014). With time and a lot of education, there is hope that there will be a social change in acceptance of prescribed fire and wildfire as a whole.

There is an ever-growing need to do more prescribed burning in the PNW. After more than a century of fire suppression, the wests' forests are primed and ready to burn. Wildfires are getting bigger and bigger with the coming of each fire season. Prescribed fire needs to be used now if there is ever a chance to restore our forest to similar past conditions and increase sustainability. Critical variables to solving this growing problem is to use more prescribed fire, securing more funding for prescribed fire programs, lessening air quality restrictions, and educating the public. Once each of these individual variables are implemented, we can expect to see the forests of the PNW return to a healthy state, ecosystems recover, and less damage from wildfires in the future. Now is the time to change because if we keep doing what we have been, there might only be a small portion of green forests left in the future.

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