

## Water Infrastructure Damage After Wildfire and How it Affects Lives

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### *Abstract*

As scientists and activists alike warn of the increasing threat of climate change, interest in learning the consequences of it has become more important than ever. While the larger impacts of global warming are mostly well-known, the effects on individuals are less at the center of attention. This proposal aims to highlight the devastating effects wildfires have on communities, particularly in California, where increasingly intense and frequent fires have destroyed towns, while simultaneously delving into the role of contaminated water in fire-stricken towns.

### ***Introduction***

In the wake of climate change, realizing the consequences of environmental change is of utmost importance. With changing climate comes changing environmental norms -- once such is the increase in intensity and frequency of wildfires. In 2020 alone, there have been almost 53,000 fires that have burned 9,539,554 acres in the United States, the second most acres burned in the past ten years (National Interagency Fire Center). While this number alone is already alarming, it does not properly represent the immense damage that occurs directly because of fires -- displaced people, burned homes, and infrastructural damage. Another source of agony is when people return to their homes after wildfires rage through their communities and remain unsure of whether the water is safe to drink. High temperatures of wildfires can easily damage water infrastructure and make returning to fire-stricken towns much harder. The questions stands: What are the consequences of wildfires on water infrastructure and how do these wildfire-induced water crises impact people who live in affected towns?

### ***Background/Related Work***

Much research has already been done in the field of climate change as well as the consequences that come from climate change. It is widely known that warming, due to increasing greenhouse gas emissions, has a greatly negative impact on the severity of the fire season, growing the intensity and frequency, as well as lengthening it (Kennedy). Understanding how climate change affects the wildfire season is only one part of the problem. Critical damage done to town infrastructure accompanies the increasing severity of wildfires, and this damage occurs in multiple places.

First, forests provide high quality water for various needs, both domestic and ecological. When wildfires are out of control and uncontained, they burn too much and produce ample contaminants, leading to a need for increased water treatment infrastructure (Bladon). Similarly, wildfires contribute greatly to infrastructural damage that also leads to an increased need for water treatment. When examining the damage of infrastructure due to fires, it is important to realize the timeframe in which these effects last. Luckily, research has already been done in this area. In an investigation into two California wildfires, it was found that the majority of effects on water quality were relatively short-term (less than one year), but higher proportions of watershed area burned significantly increase the negative effects of downstream water quality as well as the longevity of these effects (Uzun). While this may inspire some hope, wildfires are a frequent occurrence that are only becoming more common, meaning that there may not be enough time for forests to regenerate before the next fire devastates the area. Victims of wildfires find themselves with undrinkable, contaminated water in their homes once they return after fires, sometimes greeted with water that is completely black (All Things Considered), the cause being either outside contaminants being siphoned into the pipes when pyrolysis of the pipes occurs, or when water travels through contaminated portions absorb contaminants.

When people return to their homes, they are warned of possible contaminants in their water supply. To make matters worse, there is a randomness to the contaminated water in houses after fires (Horberry). While one building may have completely unsafe drinking water, buildings adjacent to it may have water that was deemed safe to use. What is even stranger is these buildings could be connected to the same underground pipelines, leading to confusion and uncertainty among residents (All Things Considered). The way in which water flows throughout underground pipes is somewhat uncertain with little research done on the subject. Learning the connections between different buildings and their water supplies could help in determining how safe water is to drink, even if some of it is contaminated.

### ***Methods***

I want to examine in further depth the way in which water travels throughout pipe systems in general but also specifically in towns affected by wildfire. In order to do this, I need to gather data of both how the underground pipe system is set up in the town as well as which houses were deemed to have unsafe water in the days following a return to the town. I will have to then compare the two and attempt to find a correlation. Additionally, comparing where wildfires were prevalent as well near the pipes will help to indicate whether contaminants were sourced from farther away and flowed into the water supply, or if there were multiple sources of contaminants. By researching into how water travels through pipelines, I will answer part of my original question by discovering how damaged pipes affect water infrastructure as well as possibly finding a solution to how these damages can be resolved.

While researching how water spreads through pipes, I also want to gather firsthand experiences of how wildfires and the immediate consequences of them (like contaminated water and pipes) affect people. In order to do this, I will be finding people and conducting interviews with them to hear their stories. Because I will be collecting interviews, I will need to be IRB approved for human subjects research. Bringing awareness to problems of climate change is of utmost importance and learning how these catastrophes affect people in their regular lives is imperative to bringing that awareness. I want to travel to Paradise, California to see how the recent wildfire there has affected people and interview people who were there during the wildfire.

### ***Expected Results***

I want to put all of this research together in order to make a short documentary about the effects of wildfires on people and their communities. The documentary would serve as a collection of the interviews with footage of the aftermath of the wildfire. There are commonly long lasting effects of wildfires on water supplies, so I want to be able to document those visually in order to elicit an emotional response in the audience. My hope is to make a documentary that reveals these ever more prevalent issues of wildfire (and through that climate change) and inspire change to prevent, or at least mitigate future disasters. The documentary

should run no more than ten minutes in length, depending on how many interviews I am able to capture (at least three at a minimum)

### ***Conclusion***

Climate change has led to an increase in natural disasters in recent years, specifically wildfires. With this increase in catastrophe comes an increase in the need for awareness as well as action. The frequency and intensity of wildfires are only increasing, and the need for change is of utmost importance. I propose creating a short documentary to not only research into how water infrastructure is damaged after fires, but also to document the stories of those affected by them.

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***Budget***

Travel costs to Paradise, CA from Los Angeles, CA (two-way): **\$317.00**

Lodging for 3 days in Paradise (Best Western): \$112/day = **\$336.00**

Camera equipment (camera already owned):

    Tripod: **\$42.00**

    Wireless Lavalier: **\$120.00**

    128GB SD Card: **\$35.00**

Total Cost Estimate: **\$850.00**