The Effects of California Wildfires on Migration
A Case Study on California Climate Change

Introduction

In the United States, 4.5 million homes were identified as being in a place of high or extreme risk of wildfire, with more than 2 million in California alone (III 2019). By these statistics, 5% of the 40 million people of California are living in homes that have a substantial risk of sustaining damage from a wildfire (PPIC 2020). In 2020, California had the fifth highest outflow migration percentage of any state at 59% with a 41% inflow migration (CBS SF 2021). As a result, Californians are moving out of the state. With 4.1 million acres burned in California from wildfires in just 2020, there is no debate that residents of California assume quite a higher risk than most by residing in the Golden State (Romeo 2021). The wildfire crisis is also expensive, with California Governor Gavin Newsom allocating $230 million to fire prevention in 2020. Even this falls short of what is necessary. Environmental groups, on the other hand, have suggested more of a financial commitment between $2 and $5 billion. (Romero 2021). Wildfire relief focus has been reactionary rather than that of prevention.

This paper explores the factors of wildfire disasters in relation to California migration. Resulting from decades of climate change, California has been subject to an increase in heat, variations in frequency of rain, and changes in plant ecosystems (Borunda 2020). This, in turn, has resulted in an increase in the intensity and severity of wildfires. Although climate change is not a factor in the data of this study, it does provide context as to why wildfires and other natural disasters including drought and mudslides have occurred more frequently and are more destructive. Within the past century, the temperature of Southern California has increased by three degrees with heat-trapping greenhouse gases warming the atmosphere by one degree in the past 50 years (EPA 2016). Economically, this results in substantial consequences for not only California but the United States Gross Domestic Product. California wildfires in particular caused economic losses of approximately $150 billion in 2018, which equates to about 0.7 percent of the gross GDP of the United States for 2018 (UC Irvine 2020). To sum the cost of climate-induced disasters, it would amount to approximately $380 million. Investment in pro-environmental policies and firms would create a short term financial loss but long term financial gain.

In this paper, the relationship between migration and the effects of a wildfire is examined using per year county data as the base for a fixed effects regression model. Migration data comes from the Internal Revenue Service (IRS), and includes both magnitude and composition of inbound and outbound migration. The wildfire data is obtained from cal.gov the California state government website, and includes the size and intensity of the fires as well as the amount of acres burned as a result of a fire.

The goal of this paper is to determine how California wildfires have influenced household migration in terms of flow and composition. The results of the data analysis find that migration does increase in areas with more wildfires, but there is no evidence that composition of households in terms of size are impacted. Furthermore, households are equally more or less likely to migrate for alternative motives such as occupation, family situation, or better schools for their children among others not listed.

Previous research has indicated that the more affluent a household is the more likely they are to return to a natural disaster frequent area after a natural disaster, such as the case in the Louisiana area ravaged by Hurricane Katrina in 2005 (Graif 2015). A lack of financial resources, specifically wealth, can decrease the ability for households to return and rebuild. In the case of California, the wealth of a household was insignificant in wildfire outward migration.

An issue with this research is the exclusion of continuity in government response to natural disaster relief. Louisiana and California must each make a different risk assessment based on the probability of occurrence and severity of natural disasters to determine the appropriate financial investment to make in disaster relief and prevention. As a result, this assessment yields varied results and affects the impact the natural disaster has economically and environmentally. Additional issues with this study include lack of comprehensive research by county as opposed to an arbitrary "disaster zone" and lack of evidence suggesting alternative reasons as to the inflow/outflow rate fluctuation. By using research gathered by county, the true boundaries of the wildfires are arbitrary and cannot be definitive by county. Additionally, alternative motive for inflow and outflow rate fluctuation is probable and every motive for migration cannot be included.

A limit in the data is an assumption that households aren't moving pre-emptively because they believe in higher fire risk areas. Although this assumption is necessary, it does not provide certainty as to the effect this reason has on household migration or lack thereof. A data decision in the data is removing counties with no fires in years of study as well, since there are multiple counties in California that have not had a fire between the years of this study. Counties with no fires can skew the aggregate results of the regression analysis, leading to slightly inaccurate results.

This paper proceeds as followed: Section 1 examines cases of natural disasters, background knowledge, and additional review of relevant studies. Section 2 describes and identifies sources of data and an explanation of the selection of the data and any issues with the data. Section 3 introduces and describes the methodology used and discusses any limitations with said methodology. Section 4 evaluates results from the methodology in charts and tables while examining the hypothesis to support or reject it including counterintuitive results and /or limitations. Section 5 concludes the paper.

1: Literature Review

Natural disasters have become increasingly violent and prevalent across the globe. Since the 1990's, the number of natural disasters has increase 35% as a result of climate change (Arvin 2020). In fact, the amount of natural disasters that are a direct cause of climate change have increased from 76% in the 2000's to 83% in the 2010's (Arvin 2020). With changes in the environment come changes in the population, specifically migration. Migration patterns can be influenced by natural disasters that are a result of climate change in many regions across the globe. In Indonesia, a scientific study was conducted that followed province-to-province movement of approximately seven thousand households over a 15 year period to determine if the previous assertion were true. The study revealed that increases in temperature "due to natural variations or global warming" are likely to have a greater effect on permanent outmigration than natural disasters (Bohra-Mishra, Oppenheimer, and Hsiang 2014). When

examined carefully, this makes sense. This study on Indonesia does not state that there is no effect on permanent migration due to natural disasters, rather that permanent migration due to a natural disaster occurs much less after a natural disaster. A natural disaster is often rapid and powerful like going down a roller coaster whereas climate change-specifically temperature increase, in this case, is like the ascension to the top of the roller coaster being a gradual and progressive climb. Often times migration due to natural disasters is forced and unpredictable (Berlemann and Steinhardt 2017), which was evident in 2005 when Hurricane Katrina ravaged the gulf coast of Louisiana. The costliest hurricane in U.S. history, killing over 1,800 people and leaving $160 billion worth of damage behind (Reid 2019). A study included in the 52nd Volume of *Demography* compared the migration patterns from the pre-disaster period to the recovery period found that recovery migration intensified with the disaster affected counties becoming more "spatially concentrated" (Curtis, Fussell, and DeWaard 2015). This study determined that migration is likely to be affected by intense and frequent storms anticipated due to climate change, which induced implications for the post-storm population in recovery locations. Environmental hazards and changes influence migration especially when vulnerability and migration are linked (Warner et al. 2010). As a result, it depends on whether individuals want to leave or if they feel it is worth migrating after a natural disaster. Climate changing factors may influence an individual's vulnerability, resulting in them migrating to another location.

In the case of Hurricane Katrina, socioeconomically vulnerable populations were slow to return to their destitute neighborhoods. These populations' vulnerability was high due to their low income and poor living situation resulting in their desire to migrate outward (Graif 2016). Social vulnerability, characterized by disadvantaged populations in densely built areas, were-in Louisiana's case-much more likely to migrate out of the area after a hurricane (Myers,et al. 2008). Vulnerability is not limited to the physical effects of a natural disaster; it also includes psychological vulnerability. Additionally, psychological vulnerability can affect migration after a natural disaster occurs. Human response to psychological disasters are decisions not based on scientific decision making, rather of value choices in risk management attempting to answer the question "How safe is safe enough?" (Drabek, Springer-Verlag 1986). Based on this theory, it is plausible to assume that a household may or may not migrate back to their previous residence due to psychological trauma of themselves or possibly even their children.

Evaluations in psychological trauma of children and young adults displaced due to a natural disaster was less traumatic than displacement due to armed conflict. However, the trauma brought upon migration from a natural disaster was statistically significant (Myles et al. 2018). Children with psychological trauma as a result of a natural disaster may refrain from migrating back to that area when they reach adulthood or the household will be inclined to not return altogether. Vulnerability in general can be decreased if the federal government provides adequate aid to disaster zones. If the proper amount of financial resources is allocated to the communities affected by a natural disaster, the socioeconomic vulnerability of the population will decrease. As a result, the outmigration after a natural disaster will be less than it would without being properly addressed by the federal government (Paul 2005). Although this logic is not applicable to nations who lack the financial resources, it stresses the importance of responsibility in rebuilding after a natural disaster and its effect on migration.

In the United States, each state prioritizes the way in which they allocate their financial resources to natural disaster relief and rebuild. Typically, states have five budgeting strategies

at their disposal: Statewide disaster accounts and rainy-day funds for pre-emptive action, supplemental appropriations and transfer authority for responsive action, and state agency budgets used for either function (PEW 2020). In the case of California, the state can implement all five mechanisms if to prevent and alleviate the cost of the damage from frequent natural disasters in the area. California in particular preemptively addressed the rebuilding of housing in areas increasingly exposed to wildfires through subsidized housing. Subsidized households are in the highest risk wildfire areas in California and most often are occupied by individuals belonging to low income, elderly, or disability brackets (Gabbe et al. 2020). These particular households are subsidized in order to create an incentive to thwart potential outward migration if wildfires or another type of natural disaster were to occur.

While many state governments are willing to accept financial responsibility for disaster relief and preemptive measures of cost prevention, others are inclined to assert financial responsibility to another entity in the court of law. To do so, a case must be built on the idea of a natural disaster being classified as an "Act of God", therefore attempting to put liability on God instead of the government. The "Act of God" defense is utilized in the rule of tort to resolve the issue of duty and causation (Review of Litigation 1995). This defense is commonly used in negligence and strict liability cases to diminish the level of responsibility an entity has to offer assistance in the form of financial relief. When used, it can be detrimental to the ability for disaster relief to be implemented and financially sufficient (Fraley 2009). On a global scale, this tort may be applicable without backlash or even acknowledgement. Globally, individuals become more religious if a natural disaster occurs near them which provides a conclusion that religion is used as a coping mechanism in dealing with natural disasters (Bentzen 2019). In the United States, however, this tort is not as easily rationalized as acceptable. State governments are still held responsible fiscally for preemptive disaster investment and disaster relief and if not, can subsequently influence migration patterns.

The above literature provides context to the causes of natural disasters and to what effect they have on migration; specifically natural disasters caused and affected by climate change, socioeconomic and psychological vulnerability, and financial and legal responsibility in responding to threats or occurrences of natural disasters. In determining the effect of wildfires on migration in California, this literature must be applied to fully understand each factor being examined in this paper and the data itself. Therefore, a delve into the origins of the data itself and its application in the study will be required.

2: Data

County California migration data and California fire data were collected from the Internal Revenue Service and state of California website, respectively. Both datasets were organized according to the migration datasets yearly brackets, following the format of 2012-2013 listed as 2013, 2013-2014 listed as 2014 and so on for each county. The IRS migration, retrieved for the years of 2013 through 2018, includes each individual county returns, exemptions and adjusted gross income. These values are the data for total migration U.S. and foreign to ensure maximum inclusiveness of data. Each one of these factors has separate outflow and inflow data per county to address outmigration and migration inward. The migration data is organized per county specifically by a one number county code corresponding

to the names of the counties in alphabetical order starting with a county code of 1 for Alameda county, 2 for Alpine county and so on. Each county has the same state code since the state code for the entirety of California is 5. Both the California migration data as well as the California fire data do not include the aggregate statistics of California as a whole when regressed, as this is a per county study. For the years of 2014 and 2015 there is a lack of return, exemption, and adjusted gross income data for Alpine county which must be highlighted.

The California fire data, retrieved at the California.gov website from the CAL FIRE archives, includes data on the number of fires that occurred in each county and the estimated number of acres burned per year. As was the case with the IRS migration data, the data from the years of 2013 to 2018 were extrapolated. Each reported fire is individually listed along with the date of the beginning of the fire, the county or counties it was located in, the number of acres burned, and the status of containment of the fire. Fires that were located in only one county were straightforward in acres burned in that specific county. However, this was not the case when a fire burned acreage in two or more counties. Fires that occurred in two or more counties did not expressly divulge the estimated acreage burned in each of the counties. If they occurred in multiple counties, these fires were not only counted separately in each county as one fire, the acreage burned was determined using additional resources and allocated as such[1]. As a result, the allocation of burned acreage to multiple counties affected by one fire may not be definitely accurate. Nevertheless, the allocation is as accurate as possible and confidence in its application in the data analysis is supported. Additionally, there are counties with no fires in all six years of the study: Alpine County, Imperial County and San Francisco County. Since these counties did not experience any reported wildfires, they were not included in the regression analysis due to a lack of significance in the dataset. A supplemental dataset from USA.com provided the total acreage of each individual county as well as the acreage in square miles. This particular dataset's contents are essential in determining the extent of wildfire acreage burned of the total acreage of a county.

3: Methodology/Model

The model used to evaluate the data is a fixed effects regression model. This particular model aims to fix average effects for the variable that may affect the outcome of the analysis. The regression equation itself varied depending on the dependent variable. The first of these equations is shown below:

$$migration_{it} = \alpha + \beta_1 Fires_{it} + \theta_i + \delta_t + \epsilon_{it}$$

Where $migration_{it}$ is one of several measures of migration in/out of a California county for a given year and an α intercept term that has no real interpretation due to this specific fixed effects regression. Where β_1 is the average within county and within year change in migration

[1] Wildfires that took place in two or more counties without distinguishable or accurate division of burned acres per county were self-allocated using methods of scientific estimation and utilization of accurate sourced government resources cited at the conclusion of the paper.

from an additional fire and $Fires_{it}$ is the number of wildfires in a county-year. Where θ_i, δ_t, and ϵ_{it} represent the county fixed effects, year fixed effects, and error term, respectively. In terms of the equations variables, additional factors will be altered such as fires, acres, % burned, etc. will all be regressed on migration in order to answer the underlying purpose of the thesis itself. As the variables are interchanged in each equation, each result must be deciphered using the same method. This method is utilized by interpreting the statistics that are generated once the regression model is run. For fixed effects regression, the t-stat, p-stat, and confidence intervals If a t-stat is above 2 or less than negative 2, the t-stat is significant. For a p-value to be considered significant, it must be less than 0.05. A confidence interval with 95% also indicates significance, which is essential in determining a defined range of values with a specific probability of the value within it.

Limits with this methodology include assumptions, one specifically being attributed to a lack of data. In terms of a lack of data, the individual household decision making process is unattainable. Each household may have their own reason for migrating that cannot be quantified using online resources. Thus, this assumption of myriad reasons for migration is applied in this thesis. Without this assumption, there lies an inconsistency prevalent in the model that would not provide as accurate of a result as it would without it. When faced with a lack of data for household rationale, it is imperative to implement an assumption to address the concerns without one. Additionally, the assumption that households do not move preemptively from or to a place where wildfires occur provides a similar limit with the methodology. The lack of data to definitively state whether households do or do not move preemptively require an assumption to address the issue. It is more likely that households do not preemptively move due to the threat of wildfires instead of moving preemptively due to the threat of wildfires. Living in an area that has the possibility of a wildfire occurring is accepted by households as a possibility that may or may not influence migration. Specifically, if the rate of wildfires increases in the area it may influence a few households to migrate outward and others move inward. Since there is no way in which to quantify this thought process as well as the small probability of it influencing the data set, an assumption is necessary. A limit with this methodology is that fixed effects does not control the variable over time. This can be addressed through the use of dummy variables. However, using dummy variables decreases both the important and unimportant information and does not offer any substantial benefit to the model. The methodology for this thesis includes the above assumptions that must be acknowledged prior to examining the results of the regression analysis. By doing so, any questions or concerns regarding the data set or methodology can be addressed in the most effective way possible through the use of assumptions when necessary.

4: Results

Table 1 shows the summary statistics table of the data. Column 1 includes the migration data specifically county, county code, state code, and year as well as each dependent variable used in the various regressions run. In column 3, the mean for each variable is calculated and provide interesting data points for inflow and outflow exemptions and returns. The inflow returns and exemptions means were 23,842 and 43,423, respectively while the outflow returns and exemptions means were 26,286 and 49,313, respectively. In terms of mean, the outflow

returns and exemptions are greater than the inflow returns and exemptions. This could infer that for migration overall, the mean outflow is slightly greater than the mean inflow indicating an initial migration pattern within the data. In column 4, the standard deviation for acres and acreage is 154532.9 and 1.28, respectively. For acreage, the standard deviation is much more reliable and closer to the mean whereas the standard deviation for acres is less reliable and more spaced from the mean. These values suggest that the amount of acreage compared to acres is more reliable in determining the number of acres per fire and acreage burned. Within the summary statistics, it is evident that the data itself is reliable and details the factors being regressed in this study.

Table 1. Migration
Overall.

	Obs	Mean	Std. Dev.	Min	Max
County	0				
County Code	354	73	126	1	999
State Code	354	5	0	5	5
Year	354	2015	1.71	2013	2018
Inflow Returns	352	23824	90507	23	930696
Inflow Exemptions	352	43423	164094.5	43	1696740
Inflow AGI	352	1725384	6700021	1530	7.09E+07
Outflow Returns	352	26286	102402	28	996035
Outflow Exemptions	352	49313	192141	50	1876128
Outflow AGI	352	1967407	7756852	-127418	7.78E+07
Fires	354	143	1076	0	9907
Acres	354	31606	154532	0	1975086
Acreage	354	3379613	1.28E+07	29996	9.97E+07
Percent Burned	354	0.009	0.026	0	0.181
Household Size Outflow	352	1.891	0.192	1.38	2.4
Household Size Inflow	352	1.91	0.23	1.26	2.49
Household Wealth Inflow	352	61	26	28	205
Household Wealth Outflow	352	58	25	-49	191
Total Flow Returns	352	50110	191409	68	1926731

Note: Total flow of returns summary statistics.

Table 2 shows the results when total migration is regressed on the number of fires, as well as county and year fixed effects. On average, each fire is associated with an additional 432 households migrating in or out of a county, controlling for year and looking within county. With a t-stat of 2.47 and a p-stat of 0.016, the total flow of migration due to fires is highly statistically significant. For the year of 2018, both the t-stat and p-stat were insignificant with a lower

coefficient of 319.2407. The total flow, both inflow and outflow, are significant in relation to fires. This does not definitively indicate that households are moving because of fires, but with each fire there are 432 households that migrate in or out of the county regardless of a specific reason. Both inflow and outflow migration are similarly significant and do not show a discrepancy in one more than the other.

Table 3 shows the inflow adjusted gross income (AGI) to fires regression model. On average, each fire is associated with an additional $16,574 in adjusted gross income, controlling for year and looking within county. The determination of significance is challenging in these data results. The t-stat of 1.98 is below 2 and the p-stat of 0.053. However, this is not entirely the case upon further examination. The discrepancy in the significance of Table 3 is greatly due to the year of 2014 being insignificant and the years of 2015 to 2018 being slightly significant. The outflow AGI regression model provided a t-stat of 1.59 and a p-stat of 0.116, indicating insignificance. The coefficient of 14097.02 indicated that on average, for every fire there is an outgoing $14,097 in AGI per household. A similar conclusion of socioeconomic change of significance was observed in the communities in Louisiana following Hurricane Katrina. Statistically, this may provide insight into natural disaster socioeconomic vulnerability and AGI migration.

Table 2. Total Flow Migration to Fires.

Total Flow Returns	Coef.	Robust Std. Err.	t-stat	P>I t I	[95% Conf.	Interval]
Fires	432	174	2.47	0.016	82	782
Year						
2014	-1282	345	-3.72	0	-1973	-591
2015	-6274	1353	-4.64	0	-8984	-3564
2016	-412	271	-1.52	0.134	-955	130
2017	5246	1526	3.44	0.001	2190	8302
2018	319	557	0.57	0.569	-797	1435

Note: Column 1 includes the factor of total flow migration for the years 2014 to 2018 regressed with fires. Column 2 includes the coefficients of the regression of the total flow return. Column 2 provides the robust standard deviation of the regression. Columns 3 and 4 include the t-stat each year.

Table 4 shows the aggregate data from the migration to acres regression model, migration to percent burned regression model, and size and wealth of household regression models. The migration to acres and migration to percent burned regression models were run on inflow returns and exemptions as well as outflow returns and exemptions. For migration to acres, the data shows insignificant t and p stats with negative coefficients. The migration to percent burned regression models also show similar results to the migrations to acres regressions. As a result, the intensity and size of a fire is not significant. For the size of the

household, the regression models showed that for every household migrating inward and outward, the size the household decreases by -.0002916 and increases by .0001206, respectively. Because of insignificant p-stats of 0.548 and 0.837 and insignificant t-stats of -0.62 and 0.21, there is no significance in the relationship between household size and migration. As a result, the size of a household is not significant.

The significance of the results is centered on the total flow migration to fires and arguably significant data of inflow wealth of households. These results provide evidence that when households migrate in and out of a county in California, the inflow adjusted gross income is significant and increases the AGI of the county.

Table 3. Inflow Adjusted Gross Income to Fires.

Inflow AGI	Coef.	Robust Std. Err.	T-Stat	P>I t I	[95% Conf.	Interval]
Fires	16574	8381	1.98	0.053	-209	33358
Year						
2014	-30495	17345	-1.76	0.084	-65229	4238
2015	-161589	35913	-4.5	0	-233504	-89674
2016	154367	55288	2.79	0.007	43655	265080
2017	320046	83247	3.84	0	153345	486746
2018	157105	42824	3.67	0.001	71349	242860

Note: Column 1 includes the factor of inflow adjusted gross income for the years 2014 to 2018 regressed with fires. Column 2 includes the coefficients of the regression of the total flow return. Column 2 provides the robust standard deviation of the regression. Columns 3 and 4 include the t-stat and p-value respectively. Columns 5 and 6 both include the confidence intervals for fires and each year.

Table 4. Additional Factors Regressed.

Migration	Coef.	T-Stat	P>I t I
Acres Inflow Exemptions	-0.005	-0.79	0.43
Acres Inflow Returns	-0.003	-0.86	0.39
Acres Outflow Exemptions	-0.003	-0.39	0.69
Acres Outflow Returns	-0.002	-0.49	0.62
Percent Burned Inflow Exemptions	-5125	-0.61	0.54
Percent Burned Inflow Returns	-3590	-0.77	0.44
Percent Burned Outflow Exemptions	-4419	-0.43	0.67
Percent Burned Outflow Returns	-3208	-0.57	0.57
Household Size Outflow	-0.0003	-0.62	0.54
Household Size Inflow	0.0001	0.21	0.83
Outflow AGI	14097	1.59	0.11

Note: Column 1 includes the factors of Acres, Percent Burned, Household, and
Outflow Adjusted Gross Income (AGI). Column 2 includes the coefficients of the
regression of the total flow return. Columns 3 and 4 include the t-stat and
p-value respectively.

5: Conclusion

California's wildfire migration is not only a natural disaster study but a study of population movement in natural disaster areas. The relationship between wildfires and migration is one of detailed specifics as opposed to common generalizations. Assumptions of individual household motive may be more impactful than a trend or common theme associated with the results. The inflow and outflow of migration are both increased when a fire occurs, which results in little difference between inflow and outflow before a fire and after a fire. Nevertheless, the issues of California's wildfires are prevalent and apparent. In January 2021 alone there were 297 fires active in the state, more than double the amount of January 2020 (Arthur 2021). Strong winds and high temperatures turn a dry forest into a flaming caldron, leaving skeletons of homes left to disintegrate to dust. The losses incurred by the state of California cannot be quantified simply by burned acres. Deaths, revenue, and migration all become influenced when in the last three years, over 3.7 million acres of land have burned due to wildfires (Newsom 2020). Although the culprit of 95% of California wildfires are humans, they are exacerbated by climate change (Gibbens 2018). Human error does not simply erase the importance of this issue as a "careless people burning their own houses to the ground", it may be the best case scenario.

Human error, while difficult in adults to change due to setbacks and relapses, can be addressed. To alter human error, there must be an understanding of the ramifications of actions. Currently, the state of California has punishments for violating the law and willfully causing a fire. These include a fine of up to $10,000 for all forms of malicious or willful arson with additional fines adding up to $50,000 as well as a strike on a criminal record under California's Three Strikes Law (Helfend 2021). In 2014, then Governor Edmund Brown declared May 7-13th as "Wildfire Awareness Week" to raise awareness of not only the danger of wildfires but the ways in which to decrease the probability of them occurring (CAL Fire 2017). In the time of this initiative there were more frequent and destructive fires by the end of the 2020 year, which suggests there must either be no change in human behavior or greater influence of climate change, or both.

Part of the motive behind Governor Brown's decision to institute a "Fire Awareness Week" was to encourage Californians to reduce water use by 20 percent and decrease water waste, since a drought can increase the amount and intensity of fires (Sacramento 2014). Droughts are invigorated by climate change as temperature increases dry up soil, disrupt precipitation patterns, and in turn cause drought (C2ES 2021). The threat of climate change has yet to cease, with Governor Gavin Newsome declaring that climate change is responsible for California's wildfires (Handa 2020). The impact of climate change on California wildfires is certainly a factual claim, which leads to the importance of addressing the specific drought issue that former Governor Brown and current Governor Gavin Newsom. The main issue with their focus on drought is the science behind it and why it is not a reason why climate change and its influence on California wildfires are one of the most important issues to address in the United States today.

Climate change causing drought will not make California drier which would have caused more wildfires. It is not a rainfall issue but a temperature increase issue. As a result of increasing temperatures, California mountain snow will melt or evaporate into rain (Luzer 2014). Increasing temperatures do affect California wildfires as greenhouse gas emissions increase and strong winds provide a greater threat to more powerful wildfires but to the

residents of California as well, as more than half of the acres burned each year in the western United States can be attributed to climate change (Miller, Mach, and Field 2020). Climate change is not an issue that plans to see itself out, but pull up a chair and make themselves feel at home. As a result, this paper illustrates and underscores the importance of addressing climate change to decrease the amount of and intensity of wildfires that can affect temporary migration.

In conducting future research, it may be beneficial to focus more on the households of two counties in California with similar demographics and risks to wildfires to identify why households may migrate out of California in the first place. Using California state resources, one could attempt to investigate the extent to which the financial stability of a household could influence the decision to move out of a wildfire affected area in California. Future research may also include the socioeconomic status of households and conduct a case study of one county in California compared to another county in Texas or a state in the Deep South to demonstrate the difference in government response, rebuilding effort, and temporary/permanent migration due to the natural disaster. Additionally, further research into California state legislation in response to not only wildfire prevention and relief but climate change could provide context into the progression of legislation in relation to the climate issues of the state within a 20 year period. In speaking on policy, the current climate policy of California may require additional legislation as wildfires have only become more frequent and more destructive. A climate policy focused on decreasing greenhouse gas emission and increasing renewable energy is imperative. California climate policies today include these two factors in Senate Bill 32 (Pavley, 2016) and Assembly Bill 32 (Nunez, 2006) to reduce greenhouse gases and in Senate Bill 100 (de Leon, 2018) and Senate Bill 350 (de Leon, 2015) to increase the requirements of renewable energy use (Berkeley Law 2021). With these bills as well as Governor Newsom's executive order of all new electric cars and trucks sold must be zero-emission vehicles by 2035, California's climate policies may prove to be impactful in mitigating the effects of climate change in the form of wildfires (Takahashi 2020). A separately focused policy on wildfires may be required, possibly a bill that allocates financial resources to wildfire prevention in terms of educational and enforcement-based behavior influencing. A subsequent bill to allocate financial investment to first responders of fires in the form of "fire copters" and other resources needed to decrease the spread of the fires.

Not only is this a migration and economic paper, but a climate paper that shows the danger other states across the country may face as a result of climate change threatening the weather and geography of the nation. Although there are multiple factors that can influence permanent migration, wildfires do not appear to be one of them. Individual household motives can judge whether climate change, wildfires, or another reason to migrate to or from California is up to the household. Nevertheless, this paper presents a case study on the climate crisis faced by the United States and the importance of addressing the issue before has an irreversible impact on climate and migration.

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