Reported Fires in the United States: An Inside Look at What May Have Caused Them

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1 Introduction

I spent two weeks traveling the Pacific Northwest in the middle of August 2021. It was 100° F at Hoh Rainforest in Olympic National Park, Washington on August 12th. While we were driving to Hoh Rainforest that morning, we noticed a smokey haze in the sky unlike the previous days. Later we learned from the Forest Ranger that smoke was being blown by the wind from wildfires in Oregon. Recalling the presence of wildfire smoke near Hoh Rainforest was very surreal. I always knew there were wildfires in California, but it was unusual to me that wildfires occurred up north in Washington. However, the National Park Service states that, "...nearly 85% of wildland fires in the United States are caused by humans."[7]. For example, last year a couple accidentally started a wildfire that burned $22,000$ acres of El Dorado Ranch Park in Southern California [3, 4]. Given that humans play such a significant role in the cause of wildfires, I wanted to see if I could identify to what extent the political climate played a role in causing wildfires. *Code that generated these plots is located on Observable, but cannot be run since I used a local database to generate the plots.*

Dataset. The primary dataset that I will be using for this analysis is the US Forest Service's Spatial Wildfire Occurrence Data for The United States [5]. This dataset contains reported fires in the United States from 1992 until 2018 resulting in $2,017,927$ rows. The dataset was provided as an `sqlite` file. I converted the sqlite file to a CSV file and then imported the CSV file into a PostgreSQL database (refer to Appendix for data cleaning queries and subsets of data) which I connected to Observable locally to conduct my analyses.

Attributes within the dataset that I used include the name of the source unit reporting the fire (i.e., Olympic National Forest), the year the fire occurred along with the exact discovery date and time, the general and specific cause of the fire (i.e., Human - Arson), the size of the fire, the state, and exact coordinates of the fire. I filtered out fires reported in 1992 and 2018 to match the terms of the three Presidents of The United States between 1993 and 2017. I also modified the dataset to include the name of the month the fire was discovered and the name of the president who was currently in office when the fire was discovered.

Analysis Questions. Is there a relationship between the number or type of fires reported and who the President of The United States was? If so, can we uncover what led up to the number or type of fires reported?

More specifically:

1. During which United State's Presidency were the most fires reported?
2. Which type of fire was the most common for each president (human or natural)?
    - Which type of human-caused fires were the most common and uncommon?
3. Under which president did the most acreage burn?

4. Where did the largest fires occur and when?

2 Overview Analysis

The dataset only has one ratio quantitative attribute: `fire_size`. The other quantitative variables (which are interval attributes) are `latitude`, `longitude`, `fire_year`, and `discovery_date`. The variable `fire_size` represents the number of acres burned from the fire; I will refer to the attribute `fire_size` occasionally as 'number of acres burned'. The range of values for this variable is between 0 and $662,700$. The largest value in this range is an outlier compared to the rest of the data points which can be seen in figure 1 and a more detailed figure 2.

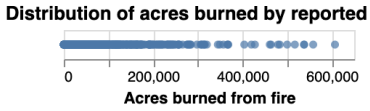

Figure 1: A distribution of the values for the attribute `fire_size`.

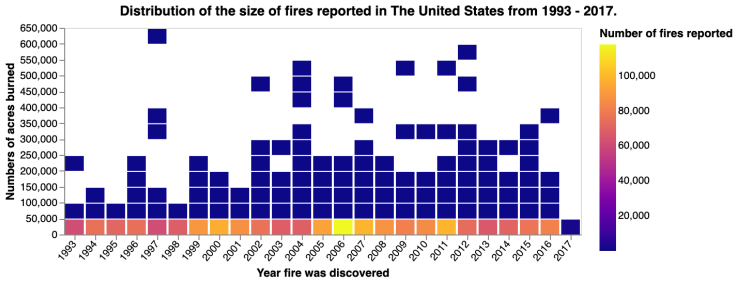

Figure 2: A distribution of fire size by year where color is associated with the count of fires reported within each bin. Note: data for 2017 only went up to January 20th, 2017.

From 1993 to 2016, it is clear that the most common size of fire burned less than $50,000$ acres. Note that the dataset I analyzed only has 19 days of January 2017. Overall, this dataset is quite large with approximately 2 million entries. However, figure 2 doesn't easily represent how many fires were reported each year. Figure 3 shows fluctuations over the years. Given that the National Park Service attributed a majority of wildfires to humans, the lack of a trend here makes sense.

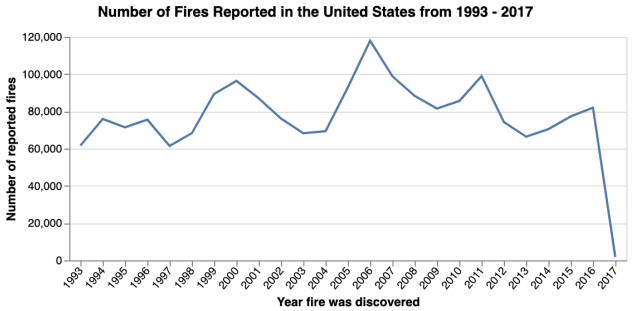

Figure 3: A distribution of the number of fires reported by year. Note: data for 2017 only went up to January 20th, 2017.

There is no trend present in figure 3, but what if we include the month and year? We may expect to see seasonal trends where more fires are reported in the hotter months and less fires are reported in the colder months. In figure 4, it shows a weak trend where more fires are reported between March and August and less fires are reported between September and January. This trend doesn't strongly follow the cold/hot months trend I originally predicted. However, if we filter for fires caused naturally, then we can see a very strong trend where fires occur most frequently between June and August (figure 5.

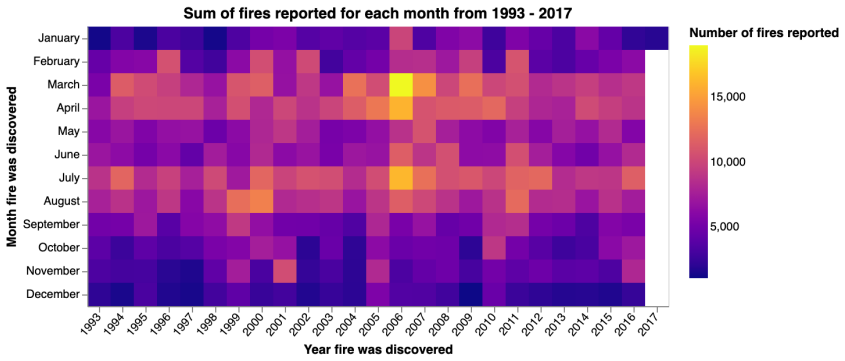

Figure 4: A distribution of the number of fires reported by year and month. Note: data for 2017 only went up to January 20th, 2017.

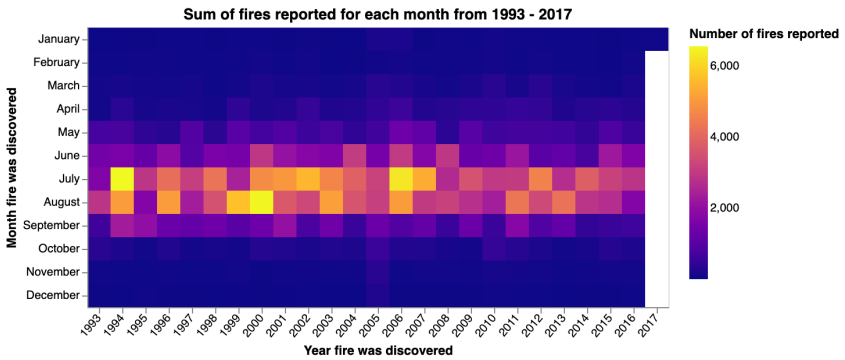

Figure 5: A distribution of the number of fires caused naturally by year and month. Note: data for 2017 only went up to January 20th, 2017.

There are several nominal attributes to probe before conducting further analyses. These attributes include `nwcg_reporting_unit_name`, `nwcg_cause_classification`, `nwcg_general_cause`, `state`, `president`, and `month`. The distribution of the attribute `Month` can be seen in figure 4.

The attribute `nwcg_reporting_unit_name` represents the organization that reported the fire (i.e., Alaska Fire Service or Olympic National Forest). In total, there are $1,745$ unique reporting units, but that cannot be easily visualized. Figure 6 shows the number of fires reported for the top 10 reporting units over the last 25 years.

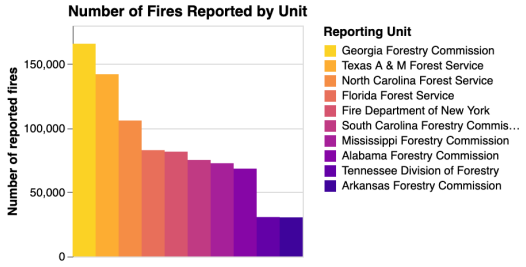

Figure 6: A distribution of the cumulative number of fires reported by the top ten reporting units between 1993 and 2017. Note: data for 2017 only went up to January 20th, 2017.

Most of the organizations reporting the most fires are forestry commissions. However, there is one outlier here which is the Fire Department of New York which is interesting. Figure 6 provides an insight into what states may have reported the most fires over this 25 year time frame (i.e., Georgia, Texas, North Carolina, Florida, and New York). We can confirm this insight by visualizing the distribution of fires reported by state. Figure 7 shows the top 10 states reporting the most fires over

the 25 year time period. Surprisingly California reports the most fires despite not showing up in figure 6. However, we are able to confirm that Georgia, Texas, North Carolina, Florida, and New York are succeeding states with the most reported fires. It did surprise me that Oregon and Washington did not show up in the top 10 states in figure 7.

Aside from looking at where these fires occurred, we can visualize a distribution of how these fires were caused through the `nwcg_cause_classification` and `nwcg_general_cause` attributes. In figure 8, you can on the left how humans cause fires much more frequently than say a lightning strike. On the right, the most common human causes are exposed showing that open burning and arson cause more fires than natural causes.

Finally, we want to visualize the distribution of number of fires reported for each president. Each president served for 8 years (two terms), so we can fairly compare the number of fires reported during each presidency. **In figure 9, we can see that the most fires were reported under George W. Bush and the least under Bill Clinton**. This figure answers the first question I asked: "During which United State's Presidency were the most fires reported?".

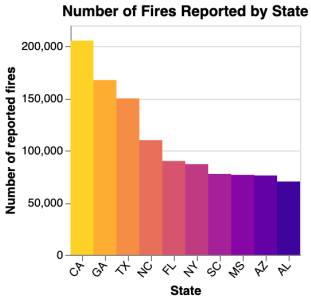

Figure 7: A distribution of the cumulative number of fires reported by the top ten reporting units between 1993 and 2017. Note: data for 2017 only went up to January 20th, 2017.

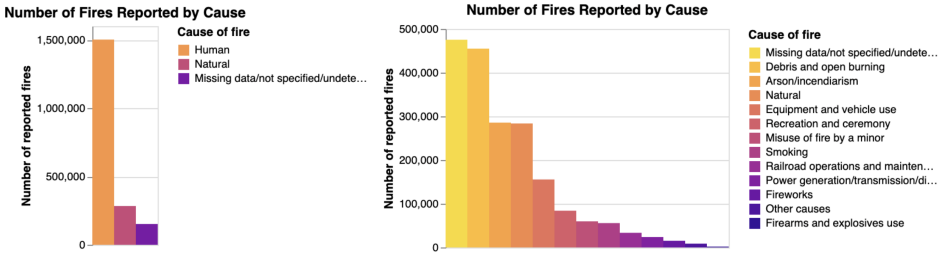

Figure 8: A distribution of the cumulative number of fires reported by cause between 1993 and 2017.

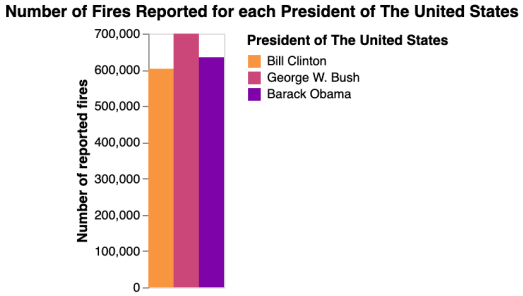

Figure 9: A distribution of the cumulative number of fires reported for each president of The United States between 1993 and 2017.

3 Exploratory Analyses

The first question I asked was already answered through the overview analyses. However, the second question, "**Which type of fire was the most common for each president (human or natural)?**" and "**Which type of human-caused fires were the most common and uncommon for each president?**" can be answered through further exploratory analyses. Addressing the first of these two questions, **human-caused fires were the most common for all three presidents as seen in figure 10**. This trend is validated in figure 8 by the number of natural vs human-caused fires within the entire dataset.

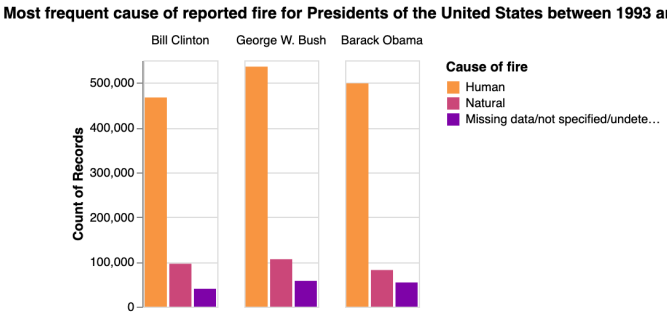

Figure 10: A distribution of the cumulative number of fires reported for each president of The United States between 1993 and 2017. Color represents the classification of the cause of the fire.

Since human-caused fires are the most popular for each president, we should identify which type of human cause was the most frequent for each president. **Firgure 11 shows that debris and open burning was the most popular across all presidents**. Arson/incendiarism was also a very frequent cause across all presidents. The least frequent cause of fires for every president was firearms and explosive use.

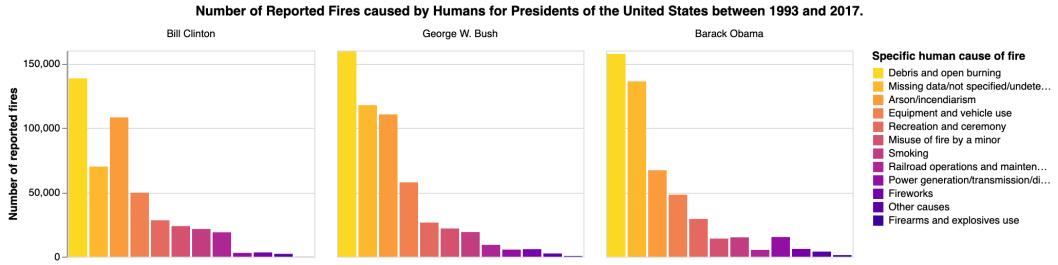

Figure 11: A distribution of the cumulative number of fires reported for each president of The United States between 1993 and 2017. Color represents the type of human action that caused the fire.

This made me wonder ***Under which president were the most fires caused by firearms and explosive use?*** Furthermore, can the answer to this question be explained by certain firearm policies that were introduced during one's presidency? In figure 12, it shows that two times more firearm and explosive use-related fires were reported under Barack Obama than George W. Bush and an even large margin between Barack Obama and Bill Clinton.

An insight into policies initiated under each president and/or national events might provide an explanation for the large number of reports for Obama. For example, just four months into Obama's second term as President of The United States, there was a bombing in Boston, Massachusetts [1]. Finding other national events during Obama's presidency proves to be difficult.

The trend in figure 12 inspires further investigation, though. ***Does this trend hold for the first and second terms for each president? If not, what changed and are there political events that we can connect to these changes?*** In figure 13, more firearms and explosives caused fires in George W. Bush's second term (2005 - 2009) than Obama's second term (2013 - 2017). The overall fires caused by firearms and explosives during both of Clinton's terms are extremely low. The Clinton administration initiated a strict firearm policy called the Violent Crime Control and Law Enforcement

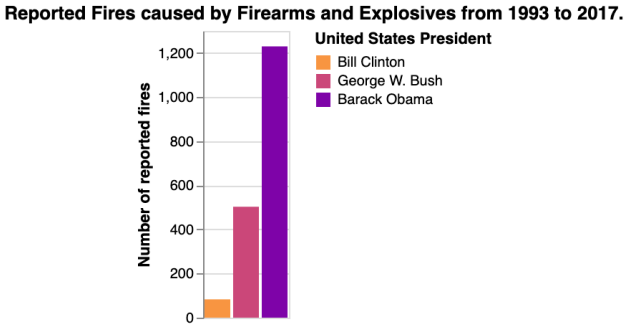

Figure 12: Sum of reported fires caused by firearms and explosives for each president.

Act which banned all assault weapons (manufacture, transfer, and possession) from 1994 through 2004 [2]. This could explain the very low count of fires caused by firearms and explosions during Clinton's first and second term and Bush's first term. We see a very large increase of fires caused by firearms and explosives in Bush's second term which can potentially be explained by the fact that the Violent Crime Control and Law Enforcement Act under the Clinton administration has not been able to be renewed since its termination in 2004 [2]. Keep in mind that Bush's second term started in the beginning of 2005.

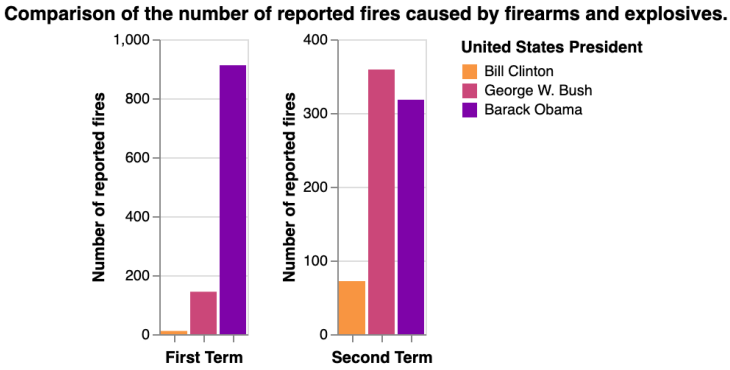

Figure 13: Comparison of fires caused by firearms and explosives for the first and second term for each president.

Fires caused by firearms and explosives contributed to a very small percentage of all fires reported while debris and open burning was the most common human-caused fire. However, I am curious in further investigating fires caused by arson/incendiarism (the second top cause of fires) since they can potentially be associated with protests. I am assuming that intentional fires at protests were categorized as arson/incendiarism but the data dictionary does not provide details on these specifics. ***Under which president did arson occur the most? Is there a significant difference between the first and second term for each president?***

Figure 14 and 15 show more fires caused by arson/incendiarism during Clinton's and Bush's presidency than Obama's presidency. After doing further research on noteworthy protests that occurred during Clinton's, Bush's, and Obama's presidency, I discovered that the political climate at the time played a role. Note: *I'm not inferring that all protests ended in arson/incendiarism, it is a means of speculation.*

For example, the Clinton administration experienced backlash (i.e., protests) when Clinton signed an abortion law that would penalize those seeking and providing abortions [6]. They quote Clinton in [6]: "We simply cannot – we must not – continue to allow the attacks, ***the incidents of arson***, the campaigns of intimidation upon law-abiding citizens that has given rise to this law". Clinton was not the only president who dealt with protests. The United States invaded Iraq and declared war on Iraq under Geroge W. Bush in his first term which ultimately resulted in numerous protests [6]. Finally, early in Obama's first term as president, a group of conservatives formed the Tea Party and later on

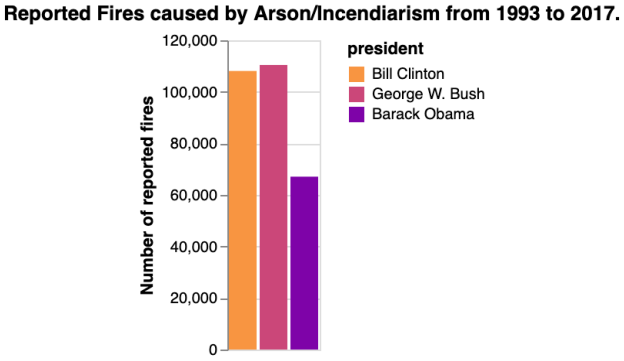

Figure 14: Sum of reported fires caused by arson/incendiarism for each president.

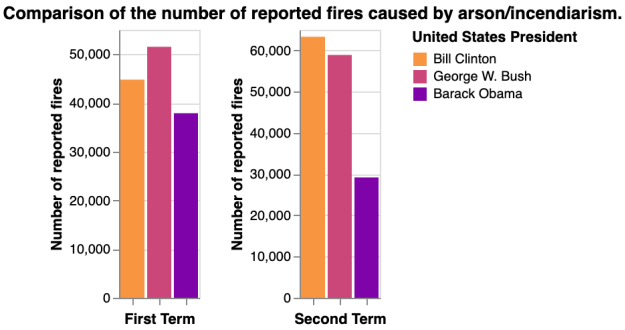

Figure 15: Comparison of fires caused by arson/incendiarism for the first and second term for each president.

the Black Lives Matter movement started [6]. Not all of these protests or movements necessarily led to arson, but the increased protests and political unrest during a presidency can certainly contribute to a higher number of fires caused by arson.

We have looked at how many fires were reported for each president and what the most popular cause of fires were for each president. We still need to address two questions: "**Under which president did the most acreage burn?**" and "**Where did the largest fires occur and when?**". Further analyses will help connect the dots for some of the previous speculations I made.

In figure 16, you can see the month and year of the largest fires, the classification cause of the fire, and who was president at the time. There are a lot of large natural fires during the summer months across all three presidents which is expected due to the dryer and hotter weather (these trends are confirmed in figure 5). Large fires caused by humans seem to have occurred more frequently during Bush's and Obama's presidency and are independent of seasons.

Identifying where these large fires occurred and on what date will allow us to potentially associate historical events with those fires. In figure 17, the largest fires that burned over $75,000$ acres are mapped onto the United States. Most of the fires are favoring the western portion of the country. Furthermore, we see a lot of large fires during Bush's and Obama's presidency.

Narrowing down the largest fires that burned over $75,000$ acres to the largest fires that were caused by humans can be seen in figure 18. There are fewer fires, but most of them remain in the western portion of the country. Finally, the largest fires that burned over $75,000$ caused specifically by arson/incendiarism are mapped in figure 19. There are 10 different fires mapped in figure 19, all of which were reported by a Forestry agency. These are most likely not the fires that were started at protests. Possibly looking at the smallest fires caused by Arson may provide a better insight into if protests are associated with arson during certain presidencies. The smallest fires were also more frequently reported than the larger fires (figure 2) and the largest fires often happened naturally (figure 16).

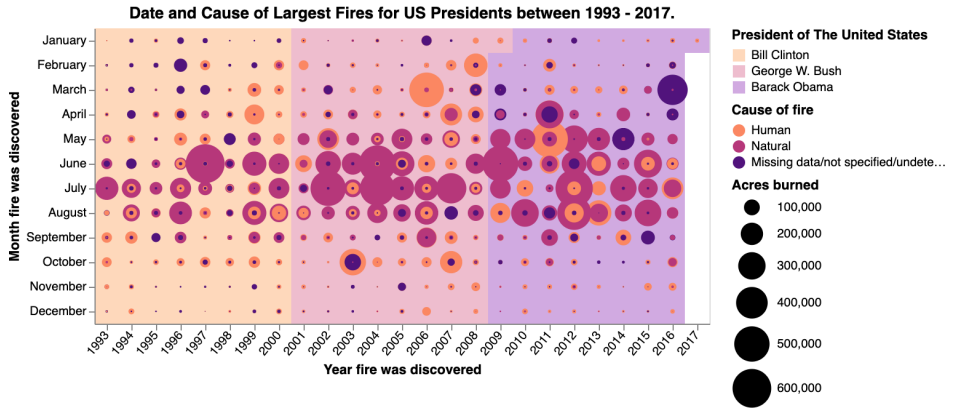

Figure 16

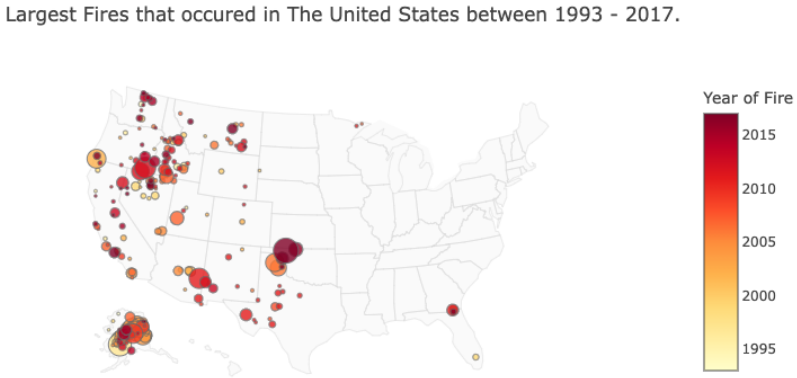

Figure 17

Instead of mapping where the smallest fires caused by arson/incendiarism occurred, figure 20 visualizes the top 15 reporting units who attended to fires caused by arson/incendiarism as a bar chart. All of the top 15 reporting units were forestry organizations who attended to fires that burned less than $75,000$ acres which provides evidence that protests are most likely not a significance influencing factor for fires or arson.

4 Conclusion

Fires of all sizes can be caused either by humans or nature. This exploratory analysis seeks to uncover the influences behind the fires caused by humans by identifying who was the president when the fire occurred and what policies or events were going on at the time. The most fires were reported while George W. Bush was president and the top two identifiable causes of fires under George W. Bush was debris/open burning and arson/incendiarism. The least common cause of fires under all presidents was from firearms and explosives, however the number of fires attributed to firearms and explosives is significantly different between Bush's first and second term of presidency. The exact reasoning for this is unknown, but my speculation is due to the termination of the Violent Crime Control and Law Enforcement Act under Bill Clinton that ended at the end of Bush's first term. Finally, after mapping the location of the largest fires caused by humans and specifcally by arson/incendiarism and visualizing the top 15 reporting units for the smallest fires caused by arson/incendiarism, there is no evidence confirming protests were a significant influencing factor. Overall, there is a relationship of the number of fires and who was president of the United States, but it remains inconclusive to

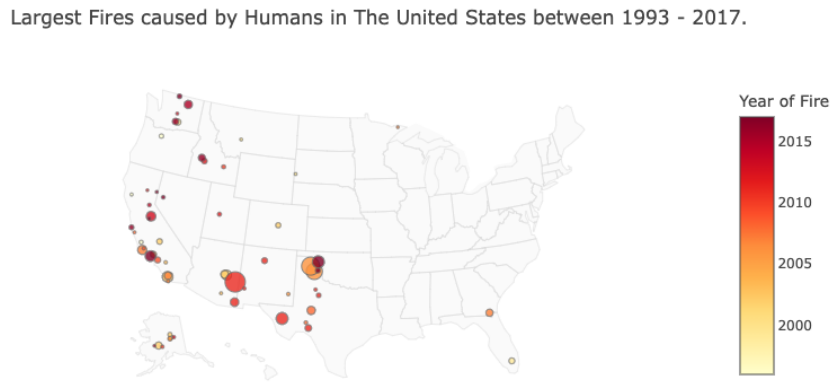

Figure 18: Visualizing where the largest fires occurred that were caused by humans and approximately what year.

Figure 19: Visualizing where the largest fires occurred that were caused by arson and approximately what year.

what extent their policies or actions influenced the fires caused by humans. It would be interesting to explore the wildfire data for President Trump, but it is currently not available. Finally, interactive visualizations could allow for deeper analyses of the data.

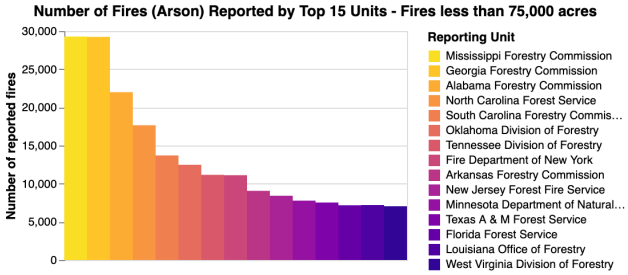

Figure 20: Top 15 reporting units for fires that burned less than 75,000 and were caused by arson/incendiarism.

References

[1] *Boston Marathon bombing*. Sept. 2021. URL: https://en.wikipedia.org/wiki/Boston_Marathon_bombing.

[2] Sarah Gray. *A Timeline of Gun Control Laws in The U.S.* Apr. 2021. URL: https://time.com/5169210/us-gun-control-laws-history-timeline/.

[3] Jesus Jiménez. *A couple face manslaughter charges after a wildfire started during a gender reveal party.* July 2021. URL: https://www.nytimes.com/2021/07/20/us/el-dorado-fire-manslaughter-gender-reveal.html?action=click&module=RelatedLinks&pgtype=Article.

[4] Christina Morales and Allyson Waller. *A Gender-Reveal Celebration Is Blamed for a Wildfire. It Isn't the First Time.* Sept. 2020. URL: https://www.nytimes.com/2020/09/07/us/gender-reveal-party-wildfire.html.

[5] Karen C. Short. *Spatial wildfire occurrence data for the United States, 1992-2018 [FPA$_F$OD$_2$0210617]*. 2021. URL: https://doi.org/10.2737/RDS-2013-0009.5.

[6] Maegan Vazquez. *How past US presidents engaged with activists and mass protests*. June 2020. URL: https://www.cnn.com/2020/06/02/politics/us-presidents-protests-change/index.html.

[7] *Wildfire Causes and Evaluations (U.S. National Park Service)*. URL: https://www.nps.gov/articles/wildfire-causes-and-evaluation.htm.

Appendix

Code that generated these plots is located on Observable, but cannot be run since I used a local database to generate the plots.

Dataset

Data Preprocessing in PostgreSQL

The original data file was provided as an `sqlite` file. I viewed the file through an `sqlite` UI (SQLiteFlow) where I ran a query to narrow down the data attributes that I specifically wanted. The exact query can be seen below. I added in statements to check that none of the variables were null because one row did not have a discovery date provided and was corrupting the CSV file format.

```
SELECT FOD_ID, NWCG_REPORTING_UNIT_NAME, FIRE_YEAR, DISCOVERY_DATE, NWCG_CAUSE_CLASSIFICATION,
NWCG_GENERAL_CAUSE, FIRE_SIZE, LATITUDE, LONGITUDE, STATE
FROM Fires
WHERE FIRE_YEAR > 1992 AND FIRE_YEAR < 2018 AND STATE IS NOT NULL AND LATITUDE IS NOT NULL
AND LONGITUDE IS NOT NULL AND FIRE_SIZE IS NOT NULL AND NWCG_GENERAL_CAUSE IS NOT NULL
AND NWCG_CAUSE_CLASSIFICATION IS NOT NULL AND DISCOVERY_DATE IS NOT NULL
AND NWCG_REPORTING_UNIT_NAME IS NOT NULL AND FIRE_YEAR IS NOT NULL AND FOD_ID IS NOT NULL
ORDER BY FIRE_YEAR
```

After running that query to narrow down the extremely large dataset, I opened up the CSV in pgAdmin where I ran several more queries:

Changing Data Types

```
ALTER TABLE firedata
ALTER COLUMN fire_year TYPE integer USING fire_year::integer

ALTER TABLE firedata
ALTER COLUMN fire_size TYPE float USING fire_size::float

ALTER TABLE firedata
ALTER COLUMN discovery_date TYPE TIMESTAMP
USING TO_TIMESTAMP(discovery_date, 'MM/DD/YYYY HH24:MI')

ALTER TABLE firedata
ALTER COLUMN latitude TYPE float USING latitude::float

ALTER TABLE firedata
ALTER COLUMN longitude TYPE float USING longitude::float
```

Updating Row Values for President

```
UPDATE firedata
SET president = 'Bill Clinton'
WHERE discovery_date > '1993-01-19'::DATE AND discovery_date < '2001-01-20'::DATE

UPDATE firedata
SET president = 'George W. Bush'
WHERE discovery_date > '2001-01-19'::DATE AND discovery_date < '2009-01-20'::DATE

UPDATE firedata
SET president = 'Barack Obama'
WHERE discovery_date > '2009-01-19'::DATE AND discovery_date < '2017-01-20'::DATE
```

Updating Row Values for Month

Example:

```
UPDATE firedata
SET month = 'January'
WHERE discovery_date LIKE "%%%%-01-%%"::DATE
```

Data Subsets

Several subsets of data were created through queries to further explore and analyze the data. Below you can find each subset label italicized and the query used to create that subset. References will be provided back to figures in this analysis that used the subset. The query verifying that the president attribute is not null is used every query because the query in the data preprocessing step did not exclude 2017 however Obama was only in office until January 19th, 2017. Thus, the president attribute for all fires reported after January 19th, 2017 is null.

reported_fires: queries

```
SELECT nwcg_reporting_unit_name, fire_year, nwcg_cause_classification,
nwcg_general_cause, fire_size, president, month, state
FROM firedata
WHERE president IS NOT NULL
ORDER BY fire_year DESC
```

reported_fires: figures

1, 2, 3, 4, 8 (left graph), 9, 10, 16

groupbyname: queries

```
SELECT nwcg_reporting_unit_name, COUNT(*)
FROM firedata
WHERE president IS NOT NULL
GROUP BY nwcg_reporting_unit_name
HAVING COUNT(*) > 30000
```

groupbyname: figures

6

groupbystate: queries

```
SELECT state, COUNT(*)
FROM firedata
WHERE president IS NOT NULL
GROUP BY state
HAVING COUNT(*) > 59000
```

groupbystate: figures

7

humancause: queries

```
SELECT nwcg_reporting_unit_name, fire_year, nwcg_cause_classification,
nwcg_general_cause, fire_size, president, month, state
FROM firedata
WHERE NOT nwcg_cause_classification = 'Human'
AND NOT nwcg_cause_classification = 'Missing data/not specified/undetermined'
AND president IS NOT NULL
ORDER BY fire_year DESC
```

humancause: figures

11, 8 (right),

natural_cause: queries

```
SELECT nwcg_reporting_unit_name, fire_year, nwcg_cause_classification,
nwcg_general_cause, fire_size, president, month, state
FROM firedata
WHERE NOT nwcg_cause_classification = 'Natural'
AND NOT nwcg_cause_classification = 'Missing data/not specified/undetermined'
AND president IS NOT NULL
ORDER BY fire_year DESC
```

natural_cause: figures

5

firearms_cause: queries

```
SELECT *
FROM firedata
WHERE nwcg_general_cause = 'Firearms and explosives use'
AND president IS NOT NULL
```

firearms_cause: figures

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arson_cause: queries

```
SELECT *
FROM firedata
WHERE nwcg_general_cause = 'Arson/incendiarism'
AND president IS NOT NULL
```

arson_cause: figures

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first_terms: queries

clinton_term1_firearms

```
SELECT *
FROM firedata
WHERE discovery_date > '1993-01-19'::DATE AND discovery_date < '1997-01-20'::DATE
AND nwcg_general_cause = 'Firearms and explosives use' AND president IS NOT NULL
```

bush_term1_firearms

```
SELECT *
FROM firedata
WHERE discovery_date > '2001-01-19'::DATE AND discovery_date < '2005-01-20'::DATE
AND nwcg_general_cause = 'Firearms and explosives use' AND president IS NOT NULL
```

obama_term1_firearms

```
SELECT *
FROM firedata
WHERE discovery_date > '2009-01-19'::DATE AND discovery_date < '2013-01-20'::DATE
AND nwcg_general_cause = 'Firearms and explosives use' AND president IS NOT NULL
```

first_terms

```
clinton_term1_firearms.concat(bush_term1_firearms, obama_term1_firearms);
```

first_terms: figures

13, 15

second_terms: queries

clinton_term2_firearms

```
SELECT *
FROM firedata
WHERE discovery_date > '1997-01-19'::DATE AND discovery_date < '2001-01-20'::DATE
AND nwcg_general_cause = 'Firearms and explosives use' AND president IS NOT NULL
```

bush_term2_firearms

```
SELECT *
FROM firedata
WHERE discovery_date > '2005-01-19'::DATE AND discovery_date < '2009-01-20'::DATE
AND nwcg_general_cause = 'Firearms and explosives use' AND president IS NOT NULL
```

obama_term2_firearms

```
SELECT *
FROM firedata
```

```
WHERE discovery_date > '2013-01-19'::DATE AND discovery_date < '2017-01-20'::DATE
AND nwcg_general_cause = 'Firearms and explosives use' AND president IS NOT NULL
```

second_terms

```
clinton_term2_firearms.concat(bush_term2_firearms, obama_term2_firearms);
```

second_terms: figures

13, 15

Largest_fires_gr_75000_acres: queries

```
SELECT FOD_ID, NWCG_REPORTING_UNIT_NAME, FIRE_YEAR, DISCOVERY_DATE, NWCG_CAUSE_CLASSIFICATION,
NWCG_GENERAL_CAUSE, FIRE_SIZE, LATITUDE, LONGITUDE, STATE
FROM Fires
WHERE FIRE_YEAR > 1992 AND FIRE_YEAR < 2018 AND STATE IS NOT NULL AND LATITUDE IS NOT NULL
AND LONGITUDE IS NOT NULL AND FIRE_SIZE IS NOT NULL AND NWCG_GENERAL_CAUSE IS NOT NULL
AND NWCG_CAUSE_CLASSIFICATION IS NOT NULL AND DISCOVERY_DATE IS NOT NULL
AND NWCG_REPORTING_UNIT_NAME IS NOT NULL AND FIRE_YEAR IS NOT NULL
AND FOD_ID IS NOT NULL AND FIRE_SIZE > 75000
ORDER BY FIRE_YEAR
```

Largest_fires_gr_75000_acres: figures

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Largest_fires_gr_75000_acres_humans: queries

```
SELECT FOD_ID, NWCG_REPORTING_UNIT_NAME, FIRE_YEAR, DISCOVERY_DATE, NWCG_CAUSE_CLASSIFICATION,
NWCG_GENERAL_CAUSE, FIRE_SIZE, LATITUDE, LONGITUDE, STATE
FROM Fires
WHERE FIRE_YEAR > 1992 AND FIRE_YEAR < 2018 AND STATE IS NOT NULL AND LATITUDE IS NOT NULL
AND LONGITUDE IS NOT NULL AND FIRE_SIZE IS NOT NULL AND NWCG_GENERAL_CAUSE IS NOT NULL
AND NWCG_CAUSE_CLASSIFICATION IS NOT NULL AND DISCOVERY_DATE IS NOT NULL
AND NWCG_REPORTING_UNIT_NAME IS NOT NULL AND FIRE_YEAR IS NOT NULL
AND FOD_ID IS NOT NULL AND FIRE_SIZE > 75000 AND NWCG_CAUSE_CLASSIFICATION = 'Human'
ORDER BY FIRE_YEAR
```

Largest_fires_gr_75000_acres_humans: figures

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Largest_fires_gr_75000_acres_arson: queries

```
SELECT FOD_ID, NWCG_REPORTING_UNIT_NAME, FIRE_YEAR, DISCOVERY_DATE, NWCG_CAUSE_CLASSIFICATION,
NWCG_GENERAL_CAUSE, FIRE_SIZE, LATITUDE, LONGITUDE, STATE
FROM Fires
WHERE FIRE_YEAR > 1992 AND FIRE_YEAR < 2018 AND STATE IS NOT NULL AND LATITUDE IS NOT NULL
AND LONGITUDE IS NOT NULL AND FIRE_SIZE IS NOT NULL AND NWCG_GENERAL_CAUSE IS NOT NULL
AND NWCG_CAUSE_CLASSIFICATION IS NOT NULL AND DISCOVERY_DATE IS NOT NULL
AND NWCG_REPORTING_UNIT_NAME IS NOT NULL AND FIRE_YEAR IS NOT NULL
AND FOD_ID IS NOT NULL AND FIRE_SIZE > 75000 AND NWCG_GENERAL_CAUSE = 'Arson/incendiarism'
ORDER BY FIRE_YEAR
```

Largest_fires_gr_75000_acres_arson: figures

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