

# Los Angeles County Fire Department Incident Web Application



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## Introduction

Wildfires are no strangers to California, but they continue to be an unpredictable force of nature. Many first responders waste no time in reporting to an incident because they know that in emergency situations, every second counts. Unfortunately, during multi-agency incidents, first responders may not be familiar with the incident area they are responding to. So what is the best way to share information between different agencies? Is there an easy way to disseminate this information so that first responders know what to expect at an incident?

Currently there is no streamlined process for sharing this kind of information. The research objective of this project is to develop a web application that can be used to share pertinent information with those out on the field. Ease of access is extremely important and first responders need information that can be easily visualized and analyzed so that they can make informed decisions. The study area for this project covers Los Angeles County, as seen in Figure 1 below, which is the most populated county in the nation with over 10 million residents.



Figure 1. Project study area

## Data and Data Sources

The web application created for this project pertains to incidents that fall within Los Angeles County. It will be useful for other agencies responding to wildfires within the county to have access to relevant information. Some of the layers that are used in this web application are provided by the Los Angeles County Fire Department. This is public data that Los Angeles County makes available to the public on its Open Data website. Historical data such as the fire history layer is provided by the National Interagency Fire Center, which is shared publicly on their file transfer protocol server.

Dataset	Source
Fire Stations	Los Angeles County Fire Department
Fire Station Jurisdictions	Los Angeles County Fire Department
Fire History	National Interagency Fire Center

Table 1. List of datasets and data sources

## Methodology

This project was divided into four phases: data acquisition, application development, application modification, and application implementation. As seen in Figure 2 below, these phases highlight the progress of the project from beginning to end. The first phase of this project focused on the acquiring the data and learning the basics of programming. Once that was complete, the next phase focused on setting up the structure of the web application and adding the data. The third phase of this project focused on modifying and designing the web application, while the final phase of this project focused on testing the web application on a mobile device.

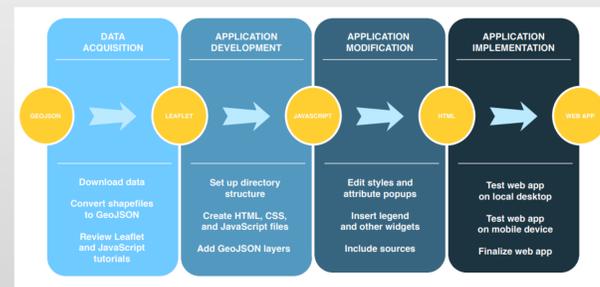


Figure 2. Methods flowchart

The data sets were downloaded as zipped shapefiles. The attribute tables for the shapefiles were edited and cleaned up and the shapefiles were converted into GeoJSON files. The GeoJSON files were added to the web application and additional features such as an interactive legend and geolocation tool were added to the web application.

The data files were saved on a Google Drive account and the DriveToWeb service was used to connect these files to an accessible web application. Since all the data was publicly accessible data, there were no additional restrictions for using this service.

## Timeline

Date	# of Weeks	Technical Step	Description
April 15 - April 21 (Proposed)	1	Review online tutorials and practice examples	It is important to review the Leaflet and ArcGIS API for JavaScript tutorials online to get a better understanding of how these codes work. There are plenty of examples to practice with and test out.
April 15 - May 12 (Actual)	4		
April 22 - April 28 (Proposed)	1	Convert shapefiles into GeoJSON	The data for this project needs to be converted from shapefiles into GeoJSON. The GeoJSON layers need to be incorporated into the code and the web application framework needs to be started.
May 13 - May 19 (Actual)	1		
April 29 - May 12 (Proposed)	2	Edit styles and attribute popups	The data layers need to be edited and styled using the standard ICS symbology. Attribute data and other details should be included as well.
May 20 - June 2 (Actual)	2		
May 13 - May 26 (Proposed)	2	Insert legend and location widgets	The look and feel of the web application can be modified now that the data is ready to go. The legend and location widgets need to be included as well as any other useful widgets.
June 3 - June 16 (Actual)	2		
May 27 - June 9 (Proposed)	2	Modify code and load data onto mobile device	The code for this web application needs to be wrapped up so that loading and testing the web application on a mobile device can begin.
June 17 - June 30 (Actual)	2		
June 10 - June 23 (Proposed)	2	Finalize web application	The web application should be completed and tested by the end of the week with all necessary changes implemented.
July 1 - July 14 (Actual)	2		

Table 2. Proposed and actual project timeline

## Results

The final product for this project is a web application that can be accessed on a mobile device. In addition to the web application, a folder with all the corresponding HTML, CSS, and JavaScript files are incorporated. In Figure 3 below, the HTML code provides the structure of the web page which ties in the CSS and JavaScript files.

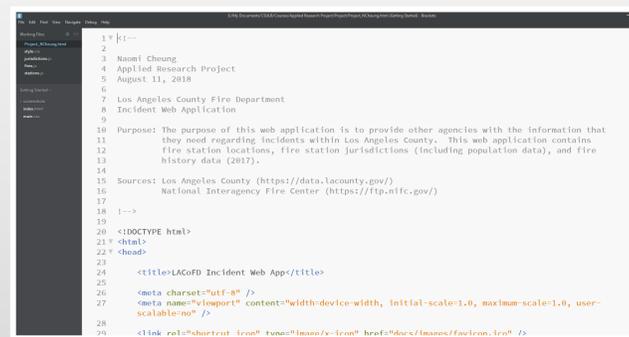


Figure 3. HTML project file

The web application has three layers that can be toggled on and off. Each of these three layers includes popups, which appear when the layers are selected as seen below in Figure 4. The fire station point layer popup displays the fire station number, address, and phone number. The fire station jurisdiction polygon layer popup displays the fire station number, battalion, division, region, and population count. The fire history polygon layer popup includes the date of the fire, the fire name, incident number, and number of acres burned.

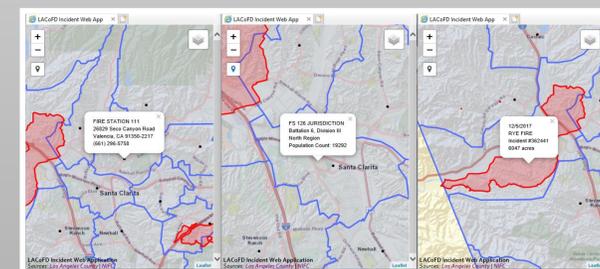


Figure 4. Data layers popups

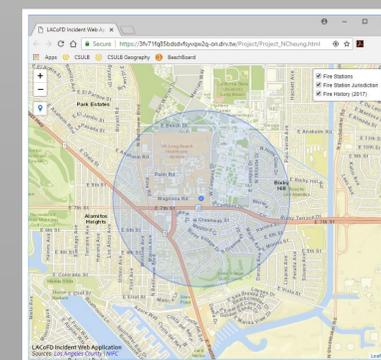


Figure 5. Geolocation tool

Another feature included in the web application is the geolocation tool. When location sharing is enabled on a mobile device, the geolocation tool zooms into the user's current location on the web application, as seen in Figure 5.

## Discussion

The web application for this project was designed primarily for mobile devices. However, the web application was designed in HTML so that it could be accessible on desktop computers as well. Designing the web application was a little challenging considering the limited screen size of mobile devices, primarily cellular phones. The final web application took into account the screen sizes of desktop computers and mobile devices and struck a balance between the two, as seen below in Figure 6.

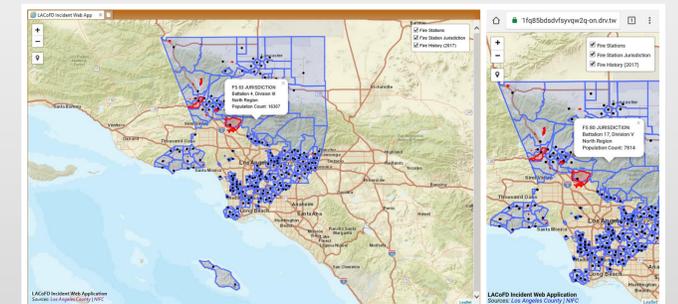


Figure 6. Web application on desktop computer and mobile device

A convenient product for distributing and accessing the web application is a QR code. For first responders, quick and easily accessible data is extremely important. Since the URL for the web application was too long, a QR code was the best option to disseminate the data, especially during an incident.

## Conclusion

The web application for this project seeks to make it easier for first responders to become familiar with their surroundings. The web application utilizes buttons, links, and popups to share additional information without taking up screen space.

One suggestion for future improvements is to include a search tool so that first responders can enter names or addresses to view the data in a particular location. Another suggestion for improving the web application is to add a labeling tool which will allow first responders to bookmark locations and recall information at a later time.

This web application focuses on Los Angeles County and wildfire incidents within its boundaries. However, this web application can be edited for use in any study area and for any type of incident. There is a growing need for web applications out in the field, and the uses for this web application can help first responders make informed decisions in order to save lives.

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