

Location of Fire Extinguishers in Student Housing and Disaster Kits Around Humboldt State University, Arcata, CA.

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Introduction

The objective of this project is to map fire extinguisher locations in student housing around Humboldt State University, as well as identify buildings that have verified disaster kits. A 75 meter buffer will also be added around buildings with disaster kits to see where disaster kit accessibility is lacking. Humboldt State University is located in Humboldt County, which is in Northern California, as shown in figure 1.

There are several different sizes and different types of fire Extinguishers. There are 4 different types of fire extinguishers found around campus. Water or foam extinguishers are for Class A fires only. Today's most widely used type of fire extinguisher is the multipurpose dry chemical that is effective on Class A, B, and C fires. Class K fire extinguishers use a wet chemical that are effective on deep fat fryers in commercial cooking operations, and may be used on Class A fires. Class A fires are fires that involve ordinary combustibles such as wood, paper, cloth, trash, and plastics. Class B fires are fires that involve flammable liquids such as gasoline, petroleum oil and paint. Class B fires also include flammable gases such as propane and butane. Class C fires are fires involving energized electrical equipment such as motors, transformers, and appliances. Class D fires are fires that involve combustible metals such as potassium, sodium, aluminum, and magnesium. Class K fires are fires that involve cooking oils and greases such as animal fats and vegetable fats. Different fire extinguishers are required for the different fire types, and should be effective when done properly.

Disaster kits on campus are meant to contain supplies for emergencies that occur on campus. They are contained in 55 gallon garbage bins, marked as emergency kits with fluorescent tape. These kits contain emergency supplies including flashlights, batteries, first aid supplies, emergency food and water, as well as various other emergency supplies. Disaster kits are meant to provide needed supplies in case of fires, floods, earthquakes, storms, or other emergencies on campus.



Figure 1. Map showing location of Humboldt County, and Humboldt State University.

(Source: ESRI & Humboldt County GIS Portal)

Methods

To start analysis, fire extinguisher locations were received from campus housing, and all other data was downloaded from HSU GIS Data Hub and the Humboldt County GIS Portal. All maps were created using ArcMap 10.1. Additionally, all maps are in WGS 1984 UTM Zone 10N. To plot the locations of fire extinguishers, point features were added to a map of Humboldt State corresponding to the buildings in which fire extinguishers are located. A new field was then created in the attribute table, to record the number of fire extinguishers in each building.

Additionally, the dorms that are divided into multiple buildings were considered one single building, and their fire extinguishers were counted as such. For disaster kits, polygon shapefile were added to represent buildings that had disaster kits present. Then 75 meter buffers were added around the buildings with disaster kits using the buffer tool, and buffer thickness was changed to 1.

Results

Every building on campus has multiple fire extinguishers. For our project we were only able to obtain extinguisher locations for on campus housing and our data is displayed as such. This does not mean that there are no fire extinguishers in other campus buildings, only that we were unable to obtain a master list of their locations. Housing buildings with fire extinguishers along with the number of extinguishers present in each building are shown below in figure 2.

According to campus emergency management, as of the last time their master list was updated, there should be 13 disaster kits in various documented buildings on campus. We have found, however, that there are only nine disaster kits actually in their correct locations. The buildings with disaster kits present are the library, Jolly Giant maintenance shed, Jolly Giant Commons, student health services, van Matre hall, old music hall, gardeners shed, biology greenhouse, and the Swetman Child Development lab. The other four kits are either missing or may have been moved without proper documentation. Buildings with disaster kits had a 75 meter buffer added, highlighting areas with a lack of disaster kit accessibility is shown in figure 3.

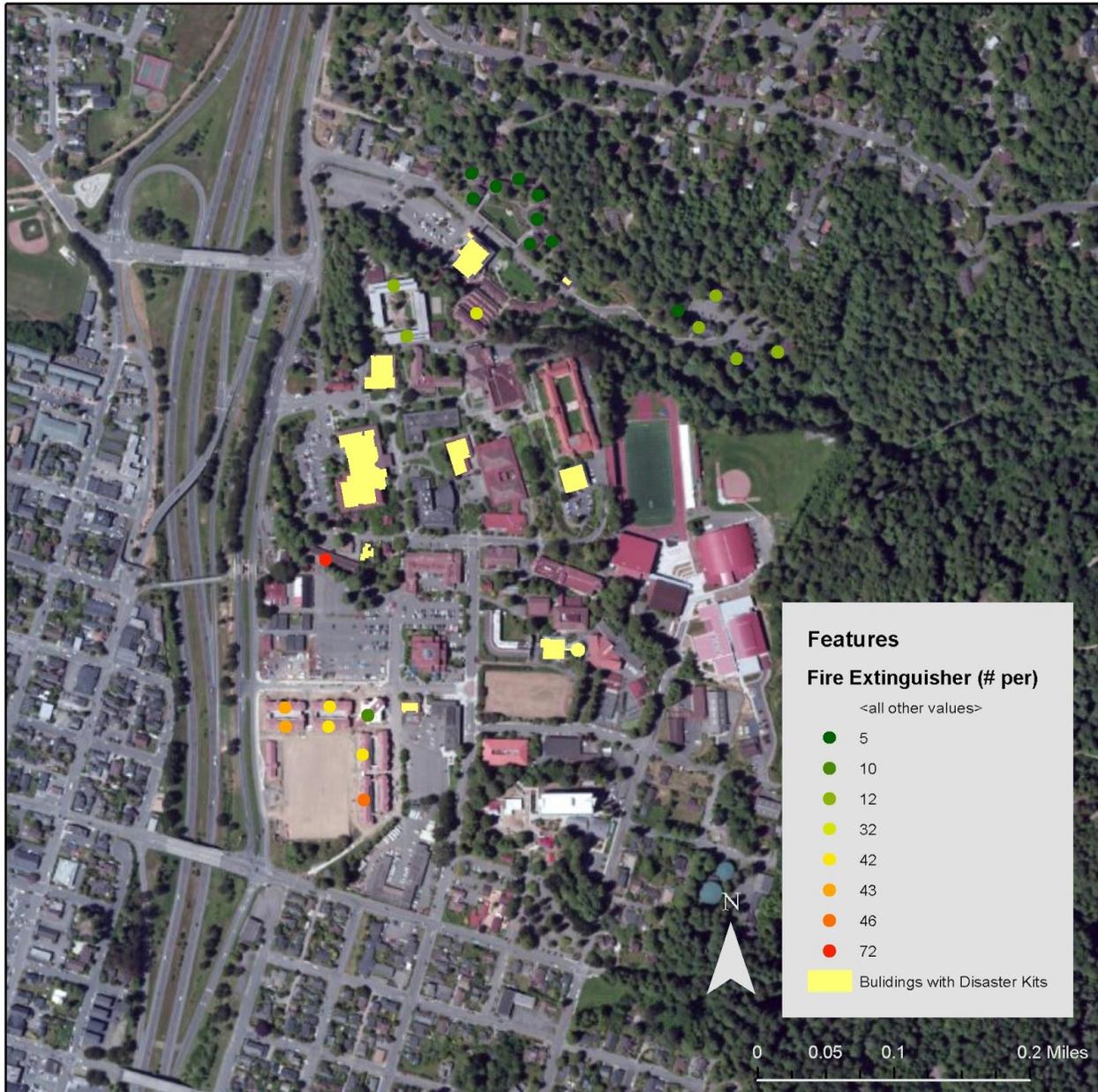


Figure 2. Map of Humboldt State University with location of fire extinguishers and emergency kits shown.

(Source: HSU GIS Data Hub)

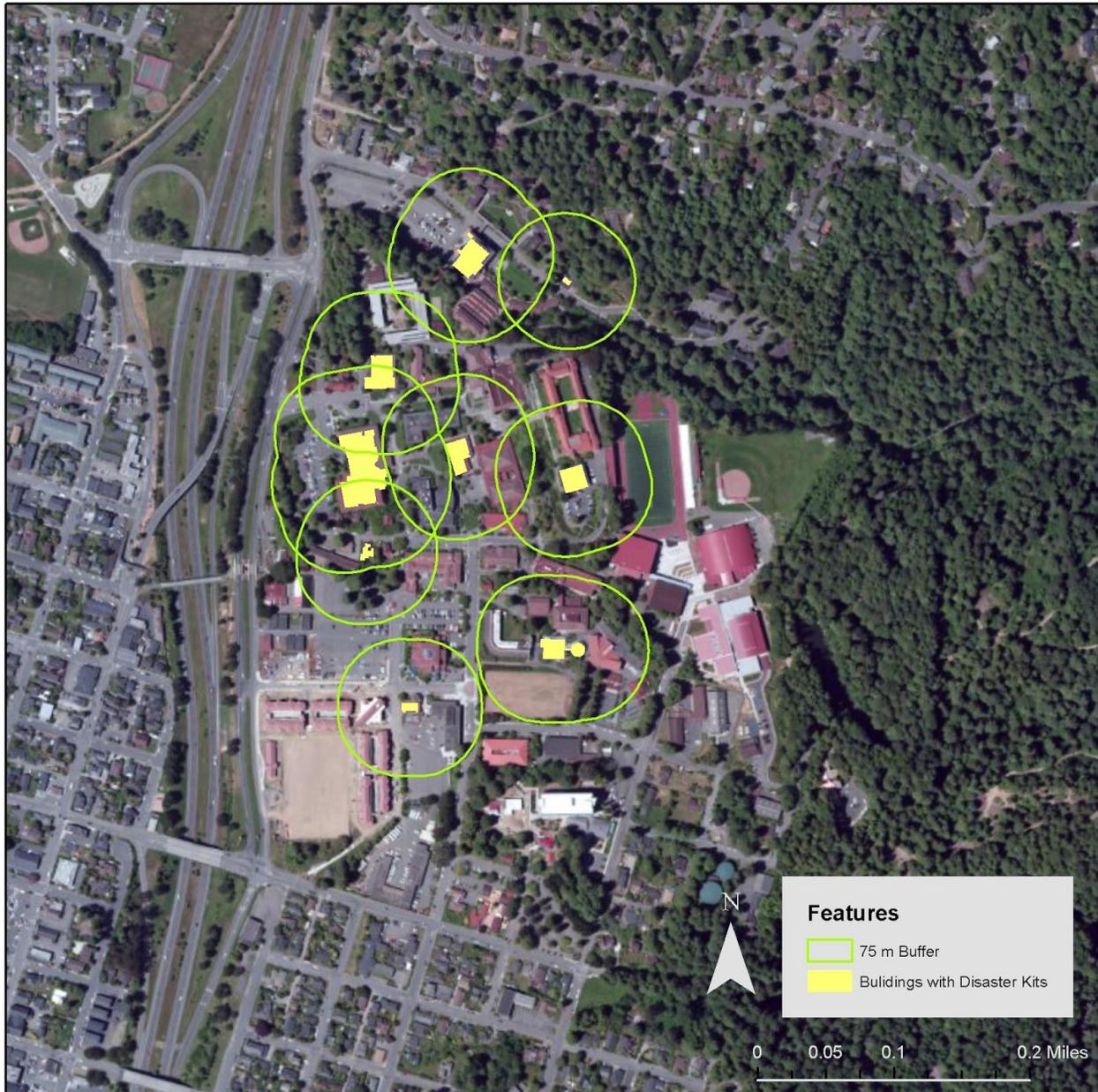


Figure 3. Map of Humboldt State University with 75 meter buffer around buildings with disaster kits, highlighting areas with a lack of disaster kit accessibility. (Source: HSU GIS Data Hub)
 Additionally, a map showing the types of fire extinguishers and, their abundance by building is shown below in table 1.

| Location by Building name | # of Fire Extinguishers by Type | | | |
|--------------------------------|---------------------------------|-----|---|-------|
| | A | ABC | K | Water |
| Fern | 0 | 12 | 0 | 0 |
| Willow | 0 | 12 | 0 | 0 |
| Laurel | 0 | 12 | 0 | 0 |
| Juniper | 0 | 12 | 0 | 0 |
| Creekside Lounge | 0 | 5 | 0 | 0 |
| Alder | 1 | 4 | 0 | 0 |
| Cedar | 1 | 3 | 0 | 1 |
| Chinquapin | 1 | 4 | 0 | 0 |
| Hemlock | 1 | 4 | 0 | 0 |
| Madrone | 1 | 4 | 0 | 0 |
| Maple | 1 | 4 | 0 | 0 |
| Tan Oak | 1 | 4 | 0 | 0 |
| Pepperwood | 1 | 3 | 0 | 1 |
| Cypress Hall | 0 | 32 | 0 | 0 |
| Sunset Hall | 0 | 12 | 0 | 0 |
| Redwood Hall | 0 | 12 | 0 | 0 |
| Campus Appartments | 0 | 72 | 0 | 0 |
| College Creek Community Center | 0 | 9 | 1 | 0 |
| Del Norte | 0 | 43 | 0 | 0 |
| Shasta | 0 | 42 | 0 | 0 |
| Trinity | 0 | 42 | 0 | 0 |
| Mendocino | 0 | 46 | 0 | 0 |

Table 1. Table showing the different types of fire extinguishers (A, ABC, K, and water), and the amount present in the different student housing buildings. (Data provided by Student Housing Services)

Conclusion

Our data provided us with helpful information about fire extinguishers and disaster kits around campus. We found out that HSU is supposed to have 13 disaster kits but only 9 can be accounted for. The four buildings that should have disaster kits but don't are the Fish Hatchery, University Annex, Forbes Complex, and University Center. Whether the unaccounted disaster kits have been moved or are missing is unknown. From the buffer we created around the existing kits, we can see that areas not within a reasonable distance from a disaster kit include the BSS Building, Kinesiology and Athletics, and the College Creek complex. The reason for this lack of safety equipment is that these buildings had not been built yet the last time the disaster kits were updated. While this is the reason, it is not an excuse, and the lack of kits in areas of high student density is cause for concern and action. In addition, student housing should have more than one emergency kit for all of housing, seeing as housing is responsible

for over two thousand students (2,142 max). Altogether, this study provided us good knowledge of where fire extinguishers are, and where disaster kits are and should be.

Acknowledgements

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