# F.L.A.S.H.: Future Los Angeles Safe-house

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### Abstract

Zombie preparedness is a topic that is being discussed more and more, mainly in the what-if scenarios and the type of weapons a person should use against a zombie, or how many zombies they would be able to kill in day. But there's rarely any discussion about the long-term zombie preparedness. With bring up questions such as where to set up sustainable food supply and a secure place to stay in. In our project F.L.A.S.H., we looked at Los Angeles County, one of the most populated counties in the USA, to narrow down a piece of land with the following criteria: must support eight people, must be a minimum 2-acre lot, on a south facing slope, on a higher elevation, low population density, and close to points of interests, and plenty of roads.

We gathered our Data from Los Angeles County GIS Data Portal. The land site was narrowed down using spatial overlays, and raster calculators. The final site is located on the northern tip of Castaic Lake, with two adjacent possible land parcels that are 100+ acres big in a low density area with a few access roads and trails.

## Introduction

In recent decades, the intensity and frequency of extreme weather events have changed dramatically. North Korea is always in the news, taking a very threatening stance toward the United States. Riots still break out in our cities. Disease is everywhere. There are hundreds of resources detailing the proper precautions people should take in the event of a global catastrophe. Los Angeles County's public health department has a website devoted to emergency preparedness. So, Properly planning for the zombie apocalypse can potentially encompass all other cataclysmic events. The purpose of our project is to find the best piece of land to start fortifying in such an event.

A properly homesteaded 2-acre lot can sustain a family of four with a plant based diet. A plant based was chosen for two reasons first, a plant based diet used less land than a primarily meat based diet as little as 0.1 hectare of land is need to support a person year on a plant based diet (Pimentel, D.& Pimentel, M. 2003) and using rotational crops to help keep the soil fertility rich. Second, keeping farm animals can be noisy may alert nearby zombies to the proposed homestead. A group of 8 survivors would be large enough to ensure fair distribution of work and small enough to reduce the chances of being detected by zombie hordes; this makes a 2.5-acre plot of land an ideal size to fortify. Solar panels would be the main source of electricity. Selecting land on the south facing side of a hill would almost guarantee sufficient sunlight (Ahmad et al 2014). Being higher up also gives the advantage of having a greater line of sight to identify threats in the distance. Other important criteria include low population density, proximity to specific points of interest for supplies (i.e. markets, hardware stores, pharmacies), flood risks, landslide risk, and possible escape routes (i.e. highways, roads, hiking trails). Though Los Angeles is not an ideal place to be during the zombie apocalypse, the need for such a fortification is inherent.

#### Methods

The following flowchart illustrates the process for selecting a candidate site for fortification during a zombie apocalypse.





After determining which parcels conformed to these parameters, we determined the optimal areas for growing crops. We started by creating a slope raster of the the county from a county digital elevation model. Next we used the raster calculator to find slopes between zero and fifteen percent. After that, we used this clipped raster to create a aspect raster, then used the raster calculator again to find the parts of the parcels with a south facing aspect. Finally, we converted the raster of the areas with optimal aspect to a vector, then used the intersect tool to show areas of optimal aspect within our parcels.

For the population map, a new field was added to the attribute table and the area was calculated for each census tract in LA. Then, the population density was calculated per square mile for each track in a new field, using the equation: [DP0010001] / [Area]. Symbology was reclassified to show 4 quartiles of density population to display visually which areas had higher and lower density.

## Results

Using the methods described, we ascertained two optimal land parcels at the north point of Castaic Lake (Fig. 2). This land offers several advantages for survival over other areas. First, the area has easy access to freshwater thanks to the aforementioned Castaic Lake as long as the reservoir's dam holds. In addition, the parcels are very close to both hiking trails and paved roads, making an emergency escape by foot or vehicle much more likely to succeed (Fig. 2). Also, none of the land area of either parcel is outside of the acceptable range for growing crops. What's more is that a significant portion of each parcel's slopes faces south, maximizing the amount of sunlight crops would receive throughout the year (Fig. 2).



Figure 2. Map showing the locations of eligible land parcels and areas of optimal slope.

The eligible sites also give decent opportunities for scavenging additional food, medicine and equipment. Nearby trails are in close proximity to several of our previously mentioned points of interest, allowing survivors to more easily make treks for needed items (Fig. 3).



Figure 3. Map showing optimal sites in relation to predetermined points of interest.

The final advantage that our optimal sites give is that are relatively far from the areas of high population density. (Fig. 4). This fact greatly reduces the likelihood of encountering undead, as the infection would spread more easily through tightly packed groups of people making dense, urban areas much more hazardous.



Figure 4. Population density by by parcel in Los Angeles County.

# Conclusion

The decision to have two final parcels was an insurance if the group of eight survivors needed to to expand their crop acreage or simply if they found other humans that may be invited to live with the group beyond the original eight. Being an open-ended topic was a great way to make each group to really think about the entire process which also strengthened our understanding of the material covered throughout the course. These various skills and techniques learned throughout the semester proved to be essential to the success of this final project. Knowing the capabilities of the tools offered by Arcmap helped to determine possible criteria, and understanding how to put together multiple elements (data processing, cartographic design, etc.) resulted in a final product that satisfied our project goal.

If time were not a factor, a few changes to our investigation could have improved its resulting data. For instance, we could have taken into account the areas which undead would likely originate instead of the simple population centers that we used. In addition, use of participatory GIS from people familiar with the area around our final homestead might improve our selection of hiking trails or roads to use. In spite of these possible improvements, our final destinations seem acceptable for our goals.

In conclusion, despite the somewhat fantastical nature of our investigation, it was far from pointless. The fact that our GIS skills can be applied to something as trivial as zombie survival shows the massive versatility of the field. These skills can be applied to plans for real world disasters, like tsunamis, earthquakes, or fires, making relief efforts that much more successful.

#### Acknowledgements

Data for this project was collected from Los Angeles County GIS Data Portal https://egis3.lacounty.gov/dataportal/tag/gis-data/

# **Works Cited**

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