# **Redwood EdVentures Quest Queries**

Blake Hildabrand and Samuel Griffard

#### Abstract

Redwood Edventures Quests are a series of interactive scavenger hunts located at parks and nature trails throughout Humboldt and Del Norte County. Our project consisted of mapping out the locations of quest visitors using participatory excel data to show to what degree each city harbored participants of the quests. We also mapped out the locations of the quests themselves for use in a variety of geospatial processes: proximity to roads, rivers, and viewsheds, when we used to attempt to find a correlation between these factors and quest popularity. In the end we failed to draw any significant correlation between water features and popularity, but our analysis did seem to suggest that road proximity has a role in quest popularity.

#### Introduction

Redwood Edventures Quests are a series of scavenger hunts designed by the Humboldt County Office of Education. Each quest consists of interpretive clues leading participants through to the end, and upon completion participants can receive a patch, unique to that specific quest, as a reward. There are 23 quests in within Humboldt County ranging from Shelter Cove at the King Range Conservation area in the south, to Jedediah Smith Redwoods State Park in the north. Quest participants can fill out cards saying where they've come from and any comments they may have about the quests. For this project, we have used the data given by quest participants through an online website to represent the cities visitors have come from in California and Oregon and how many have come from each city. The data was collected from 2014-2017.

We've displayed where the quests all are on a seperate map, and used the quest locations for further analysis. We focused on the quests themselves and their proximity to features, trying to draw a correlation between them and the visitor data. We chose to analyze quest proximity to rivers and streams and quest proximity to roads, and then compare this to the amount of visitors at each quest to determine if quest popularity is related to any of these features. We chose proximity to roads because ease of access is likely to be a major component in determining the amount of visitors, and we chose proximity to water features for aesthetic and possible recreation purposes.

#### Methods

We began with visitor data in excel format, provided to us by the Humboldt County Office of Education. Upon cleaning up and organizing the data, locational latitude and longitude of the visitors home cities was obtained from the internet and added to our excel data. This was used to create points on the map showing the visitor home cities. Amount of visitors from each city was used in conjunction with the symbology in ArcMaps to display the amount of visitors using graduated size and color.

We also obtained the latitude and longitude of the quests themselves and created a locator map showing the quest locations in Humboldt and Del Norte County. It was decided the quest locations and the visitor locations should be shown separately, due to the amount of overlap present around Humboldt Bay. We added shapefiles of rivers and roads to the map as well for proximity analysis to cross reference with site popularity to examine any possible correlations.

We created a 300 meter buffer around each quest location, and used that to clip a rivers and streams shapefile to get rivers and streams nearby to quests. Once clipped, we manually added up stream length within these buffer zones, and then created a chart in excel showing the length of water features around each quest area. For roads, we used a county roads shapefile and selected several classes of roads for analysis. We chose roads whos functions were listed as Urban and Rural Arterial and Urban and Rural Collector, and then used the select by location query to find all roads within 3200 meters (about 2 miles) of each quest site. This data was compared with quest popularity and water feature abundance.

In the end we also performed an analysis to determine the proportion of visitors from Humboldt County. Using the select by attribute command, we selected the counts from only local cities, and then selected statistics to obtain a sum. We compared the county sum of visitors to the out of county sum, and created a table to display that data.

## **Results**



Figure 1: Participant home cities, displaying amount of participants from each city.



Figure 2: Quest Locations within Humboldt County



Figure 3: An example of our method for determining stream length within quest areas. A 300 meter buffer was created around each quest and used to clip a rivers shapefile, leaving only sections of polylines within the buffer zones.



Figure 4: Quest Proximity to major roads and highways. Quests with gold stars are within 3,200 meters, quests with blue stars are further.



Figure 2: Quest Popularity, defined as percentage of total visitors visiting each quest.



Figure 3: Displaying number of unique cities visiting each quest.



Figure 4: Length of Water Features within a 300 meter buffer around each quest. Quests without values have no water features defined on the map. Gray Falls and Jedediah Smith were excluded due to being out of county.

Participant Location	Number of Participants	Percent of the Total
Within Humboldt		66%
County	303	
Out of County	156	33%
Total Participants	459	

Table 1: Proportion of participants within Humboldt County

## Conclusion

Our analysis in the end failed to draw a significant correlation between the roads or water features and quest popularity. The most popular site, Headwaters Forest Reserve, had only a middling amount of water features and wasn't near (per out definition of 3200 meters, almost 2 miles) any major highway. There was a correlation when looking at quest site to road proximity. The further away a site was to a major highway the more negative of an effect it had on its popularity; the majority of the least visited quests were not near the roads. Water features had no discernible correlation on a quests popularity.

This Project was a great way to incorporate a community partners project into a geospatial analysis framework. We were able to take some raw data provided for the HCOE, perform our own spatial analysis, and then examine any correlations that appeared between the most popular quest sites and what those quests have to offer in terms of rivers, views, or ease of access. We attempted to generate viewsheds for each quest as well, and then use the viewsheds to calculate which quest had the 'largest' view. It turns out this is really difficult to do in Arc due to a combination the project's scope (many points) and time restrictions, thus that particular analysis was scrapped. It provided a valuable learning experience. In the professional world we will oftentimes have to troubleshoot problems ourselves and this was a great chance to practice this.

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