**BACKGROUND**

As populations throughout the United States continue to increase, the greater the impact natural hazards will have on at-risk communities throughout the country due to poor planning and lack of access to necessary resources in the event of an hazard. Alaska, a region known for its frequent earthquakes, often of very high magnitudes is at a great risk for loss in the event of an earthquake. When a high magnitude earthquake hits, the effects can include several losses such as lives, jobs, and infrastructure. These disasters negatively affect communities, economies, and institutions. It is important to determine the areas that are most vulnerable to earthquakes and the populations that might be affected differently due to factors that make them more socially vulnerable such as age, race, disability, gender, and socioeconomic status. It has become clear that there is a large divide with how people are impacted by damaging events depending on social conditions that can deter emergency response and recovery (Figerio et al.). This project seeks to understand the overlap between seismic hazard and social vulnerability in Alaska in order to identify which areas need more attention from emergency responders in the aftermath of an earthquake.

**METHODS**

In order to perform this analysis, seismic hazard data needed to be paired with a social vulnerability index. Based off of the seismic hazard data, the area in Alaska most prone to very damaging earthquakes was determined to be Anchorage county. To create a social vulnerability index, ten indicators were chosen based off of literature and the CDC’s Social Vulnerability Index. These indicators fell into four different categories that were combined in order to determine the social vulnerability index of each census tract in Anchorage. These categories were:

1) **Household Composition and Disability**
2) **Socioeconomic Status**
3) **Housing and Transportation**
4) **Minority Status**

These four categories were calculated using 2014 census data for Anchorage county. Each category was given a score ranging from 1 to 5, where 5 is the highest vulnerability and 1 is the lowest. Next, since the whole area of Anchorage had the same predicted level of ground shaking, data on the most recent earthquakes was obtained and a buffer of 10, 20, and 30 miles from the epicenters of these earthquakes was calculated.

A weighted average of the social vulnerability factors and the buffer areas was then taken to determine the areas of highest risk. The weights of each factor was determined from previous literature and research and was calculated as follows: (socioeconomic status*.29)+(minority status*.14)+(housing and transportation*.24)+(household composition and disability*.3)+(buffer area*.03) The final vulnerability score is on a scale from 1 to 4 with 4 being the highest vulnerability and 1 being the lowest.

**RESULTS**

The final map, Seismic and Social Vulnerability shows that the areas at highest risk are those farther inland. While these areas are less populated than those closer to the shore, this means that people in these areas are farther from the heart of the city of Anchorage and therefore have less access to resources in that area. The areas with lowest vulnerability are those that are in the center of the city likely because they have easier access to resources such as education, transportation, and health care. One limitation of this study includes that the ground shaking data was very generalized leading the analysis to be performed based on distance from the epicenter of an earthquake that already occurred rather than predictions of future earthquakes. Also, there were additional indicators that were left out of the four categories such as annual income, single parenting households, and housing structure and year that could change the composition of the overall social vulnerability indicator.