

3.1.3 Bluff Erosion Modeling

Bluff erosion hazards were projected using average erosion rates for Santa Barbara bluffs over a time horizon of 75 years, a timeframe derived from the planned lifetime of a building or structure. This method ignores the spatial and temporal variations of large landslide events, which occur at unpredictable times. Given a long enough time period, however, historic rates of erosion can capture much of this variation. Therefore, our results indicate what the bluffs may look like in 75 years, but they do not capture the hazards of a very large landslide that could occur along the most susceptible geologic substrates.

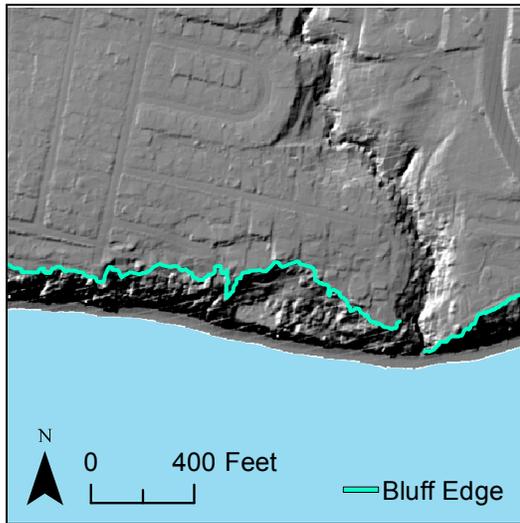


Figure 3.5: Estimating a bluff edge from LiDAR imagery.

In order to determine the bluff edge of the City bluffs, a hill-shaded version of the DEM was used. The bluff edge was hand-digitized following the methodology of the USGS (Hapke & Reid, 2007) as shown in **Figure 3.5**. Hill-shading allowed for the visual inspection of known locations with more than one possible bluff edge. For example, there may be more than one bluff edge at El Camino de La Luz, the Clark Estate bluffs, and at the western edge of the City (look closely at the middle of **Figure 3.5**). The defined bluff edge was then set back by three erosion rates: 6, 12, and 24 inches/year. The historical range of average bluff retreat rates in Santa Barbara is 6 to 12 inches per year to account for the historical range of average bluff retreat in Santa Barbara (Griggs et al., 2005). To account for a heightened effect of sea level

rise on erosion rates, a doubled rate of 24 inches/year was selected based on the literature (see **Figure 3.6**, (Griggs & Russell, 2012)).



Figure 3.6: 75-year bluff erosion projections.