Abstract
La Quemada, Zacatecas, was part of a regional network of centers known to have interacted through ceramic exchange during the Epiclassic period (A.D. 600-900). This study utilizes a least-cost path analysis to evaluate the geographic accessibility of neighboring centers to La Quemada. Based on the current understanding of ceramic exchange in this region, it was expected that El Teul would be the trading partner with the least associated travel costs. This poster presents the methods and results of the analysis and suggests that more intensive exchange relations seem to be with the nearest neighbors, as measured by travel costs, which raises interesting questions about the web of social relations.

Analysis
This study produced rather surprising results concerning the relationship between La Quemada and El Teul. Table 4 clearly shows that, based simply on travel time, Cerro Tepezuasco was the most geographically accessible site other than La Quemada, not El Teul. In fact, according to this analysis, El Teul actually takes the second longest amount of travel time from La Alita Vista. Figure 3 shows that the paths to Cerro Tepezuasco, Las Ventanas and Nochistlan are exactly the same until a point approximately 15-20km north of Cerro Tepezuasco. The travel times to Las Ventanas and Nochistlan, however, are about two days longer than that to Cerro Tepezuasco. This is surprising because these three centers are all located within 30-40km of each other, therefore the difference in travel time can be attributed to the increase in elevation between Cerro Tepezuasco and Las Ventanas and Nochistlan. Furthermore, all of these centers were more geographically accessible from La Quemada than El Teul most likely because it is in a valley adjacent to the Malpaso Valley.

Discussion
Since El Teul was not found to be the most geographically accessible site other factors must be explored to find an explanation for the overwhelming presence of ceramics produced in the Tlatenango Valley at La Quemada. Several archaeologists have discussed evidence of extensive violence and conflict in the Malpaso Valley (Almeida 1964, 1966; Brown 1985; Kelley 1971; Nelson 1997; Trombold 2000). This research seeks to gain a better understanding of how La Quemada fits into this network of relationships by examining the exchange of rare decorated ceramics in the region (Schavitzi et al. 1996). Jimenez Betts (personal communication to Ben Nelson 2007) proposed production areas (typically specified to a valley region, not a site) for most of the ceramic types found at La Quemada based on their form, style and decoration (Table 1). This table suggests that a large proportion of the decorated ceramics found at La Quemada were produced in the Tlatenango Valley. Based on this pattern it was concluded that the Malpaso Valley may have had a greater amount of interaction with the Tlatenango Valley than with other valleys in the region (Figure 2). To examine this relationship, I determined the length of time required to travel between La Quemada and other centers in the region. It was expected that traveling from La Quemada to the site of El Teul, located in the Tlatenango Valley, should take less time than traveling to other centers.

Methods
A cost surface model was used to evaluate the relative geographic accessibility of various regional centers to travelers making round trips from La Quemada. I used a 90-m resolution digital elevation model (DEM) of the region of northwestern Mexico acquired from the Global Land Cover Facility (GLCF). The original projection of this DEM was Latitude-Longitude, but all work was done in UTM. The centers of Alita Vista, Cerro Tepezuasco, El Teul, Las Ventanas and Nochistlan were chosen because each represents another major occupied area that was, for the most part, contemporaneous with La Quemada (Figure 2). A series of anisotropic cost surfaces, meaning the properties of the surface change depending on the direction over which it is traversed, were created using a module in GRASS GIS. This module takes into consideration the distance covered, changes in elevation based on specific slope intervals, as well as coefficients figured for energy expended while walking. These cost values were then used to create paths across the landscape that least amount of effort was needed to travel from one point to another (Figure 3). Each path provided the travel time from one center to another in seconds, which was then converted into the number of days it would take an individual to reach its destination (assuming an eight-hour day of continuous walking).

Conclusion
Due to the evidence for ceramic exchange in northwestern Mexico it was proposed that the strongest trade relationship the residents of La Quemada maintained would have been with the nearest neighbor in terms of travel logistics. This expectation was evaluated through a least cost path analysis and found to be rejected based solely on data collected concerning travel time between centers in the region. It was concluded, therefore, that episodic warfare in the region may have influenced the pattern of ceramic exchange observed between La Quemada and El Teul. Further research will revolve around detailed ceramic provenance studies as well as the incorporation of other parts of the region (Bajio, Jalisco and more of the Bolaos) and exchange patterns of other product types (obsidian, greenstone, shell, sculpted figurines, etc).

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†See handout for references.
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