CHAPTER 6

CONCLUSION

This chapter brings this thesis to a close and discusses future possible research endeavors. The results of the least-cost paths through portions northern San Diego County reveal many possibilities in the use of GIS and archaeology. I began with a fuzzy idea of what I would like to accomplish in the way of a research project. The beginning was a modest trial of one least-cost path through the terrain on one DEM. From there the project expanded to as many as 33 DEMs and ultimately shrank to two DEMs. What became evident is that the project could be expanded infinitely. For a modest list of local possibilities I have come up with the following problems for the future:

FUTURE QUESTIONS:

1. What archeological evidence supports the existence of trade networks or subsistence networks to Lost Valley from the west and/or east?

2. Do existing footpaths match those modeled in the least-cost path analysis?

3. How do the results of the least-cost path analysis coincide with the evidence of footpaths in protohistory and history? Are these the same as the Late Period pathways used by the Cupeño?

FURTHER INQUERIES:

Additionally, I have pondered some of the following ideas for avenues of future research. First, the excavated material from Lost Valley, can be compared to excavation or surface collected material from sites located along the network of least-cost paths. Possible travel networks equal possible social networks.

Second, San Gorgonio pass was used to travel from the Banning area to the Colton area. The San Gorgonio pass is another location that can be found on a map and checked through inspection of aerial photographs in seeking information on the locations of trails that lead in and out of the surrounding canyons (Barrows 1900:25-26).

Third, a true test of the reliability of the modeled LCPs would be to take a Global Positioning System (GPS) and follow the trails on the ground, then compare the readings to

the least-cost paths generated by the software. The trails into Anza-Borrego are California State Parks lands and are open to foot travel. Taking the GPS readings for the trail(s) from Lost Valley into Anza-Borrego would be an excellent future project.

Fourth, an inspection of the LCP at the watershed crossing (see Fig. 22) using a buffer of 100 yards on either side to see where the trail(s) cross the watershed boundary would be another important study. If the inspection is fruitful, the same test could be made for other watershed crossings. The watershed boundaries near Lost Valley are in an area of minimal impact through human use or development, so these LCP crossings are the best places to ferret out the original trails through the mountains and into the desert.

LAST COMMENTS AND OBSERVATIONS

In her demonstration of trade networks in the northeastern United States, Kathleen Allen (1990) showed how GIS could be used to model trade networks following the watersheds or waterways. Waterways, used as transportation networks, played a part in the distribution of goods between tribes in the Great Lakes area of New York State. I have shown that the drainage systems in southern California were a perfect system for travel. The LCP network seems for the most part to follow the natural topography through which the main passages are the drainage systems in the irregular and rugged terrain of California.

Reflecting on the urban trail study by Helbing et al. (1997), trail development over urban green spaces are predictable. Humans tend to walk through bare ground areas in ways that can be forecasted and arrangements are commonly made when planning walkways and thoroughfares. The ideas from Helbing and colleagues (1997) help one to realize that we are predictable creatures of habit following previously made footpaths rather than continually forging new ones. It is far more comfortable and more secure to follow a known path that has been used successfully in the past. Using footpaths that are well worn gives the traveler a certainty that you will arrive at the desired destination. There is more certainty that a trail will follow a path of least resistance, which will make the going easier. Trails leave a remnant of lived experience.

Here in California we do not have the remnants of indigenous monumental architecture. Many landscape studies rely on the monumental architecture of past peoples as their focus of study. Zedeño (2000:98) reminds us that in contrast to the study of

monumental architectural remains, hunter-gatherers "built their social environment around the extraction and appropriation of localized natural resources—plants, animals, minerals, and landforms." The LCPs generated through my study could reveal the pathways that follow these natural resources. Plant and animal resources concentrate around areas of water, including drainages, ephemeral or not.

Of equal importance to my study, the idea explored by Zedeño that single landmarks are linked "into an integrated network or landscape" (2000: 98, emphasis in original). This thought leads me to put forth the idea that my network model may show areas where sites should be found but have not yet been recorded, like a predictive model of nodes along a network.

Lastly, in scrutinizing the maps with probable site areas shown (Figs. 11 and 12), there is a lack of site probability on the LCP from *Kupa* to Lost Valley. Why would this be so? One reason may be because of a lack of systematic archaeological surveys in the area because of private land ownership. Another reason could be because it may not be easily passable because of steepness, thick vegetation, or other natural impediments to travel. Alternately, if the trail is steep, then it may be suitable for travel, but not for habitations that would leave archaeological evidence. There are many questions that remain unanswered.

It is hoped that this research can serve as a foundation for researchers from geography and archaeology that are looking to combine disciplinary methods in their studies. Archaeological field school and course work in GIS formed the basis for pursuing this experiment in methods in a cross-disciplinary work. Cross-disciplinary research has its difficulties, such as lack of cross-disciplinary mentors and specialists. The rewards far outweigh the disappointments. The drawbacks are but mere challenges for the ambitious.