

TRAILS THROUGH THE LANDSCAPE OF THE COLORADO DESERT

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Ongoing studies of travel routes in the Colorado Desert in southeastern California indicate that an extensive system of prehistoric trails still exists in this area. Geographic information system (GIS) analysis is being used to develop a model to help locate travel corridors where only segments of trails have been identified. To achieve this goal, potential routes based on geographic factors are mapped, and then a field team checks the accuracy of the predicted alignments.

INTRODUCTION

This study was part of ongoing research involving the mapping of Native American trails in the Colorado Desert in southeastern California. The preservation of these trails is important to Native Americans and public land managing agencies responsible for cultural resources. In addition, the trails have a scientific value that includes aiding ethnographic studies on religion, settlement, exchange, and technology over time (e.g., Apple and Cleland 2001; Chartkoff 1983; Davis 1961; Heizer 1978; Pigniolo et al. 1997; Rogers 1966; Sample 1950). Previous studies have reviewed the significance of verifying these trails, and have begun to utilize the geographical features of a corridor to help determine likely paths (Apple 2005; Apple et al. 2006). To assist with the documentation, a key question was asked: Is it possible to reconstruct prehistoric travel routes based on ethnographic and geographical data?

METHODS

Archaeological field surveys were integrated with geographic information system (GIS) analysis to provide a means to identify locations of prehistoric trails by modeling alignments to likely destinations. GIS modeling was used to help predict travel corridors where only segments of trails have been identified. To achieve this goal, potential routes based on geographical factors were mapped and then a field team checked the accuracy of the predicted alignments. The geographical factors included the slope and elevation of the surrounding landscape. This study focused on segments of a recently identified trail that intersects a well-known travel route (CA-IMP-398). The recorded portion of the known segment ends approximately 760 m southeast of the intersection with IMP-398 (Figure 1). At this point, the trail enters a broad, braided seasonal wash area and is no longer visible. A Least Cost Path (LCP) Digital Elevation Model was employed to plot hypothetical locations of where the trail would continue.

Seven potential routes were mapped using an LCP (Figure 2). A 30-m digital elevation map was used. LCP 1 connected IMP-398 and the northern end of an archivally reported trail. The starting point for LCP 2 was approximately 770 m southeast of the intersection with IMP-398, where the trail entered a large seasonal wash and was no longer discernable. The termination was the northern end of an archivally reported trail. LCP 3 had the same start point as LCP 2, with an end point in Indian Pass. LCP 4 had the same start and end points as LCP 3, but the known end point of a newly recorded trail segment was added to the analysis. The start point of LCP 5 was the intersection of IMP-398, and the end point was the southern end of the newly recorded trail segment. The start point for LCP 6 was the same as LCP 2. This path integrated the newly recorded trail segments. LCP 7 also has the same start point as LCP 2, with the end point at the northern terminus of an archivally reported trail.

During fieldwork, five segments of the recently identified trail were mapped using a sub-meter-accurate Global Positioning System (GPS) device. Cultural materials were present along several of these segments, including a rock feature and lithic artifacts (Figure 3). As predicted by the LCP models, the trail continued in a southern direction for approximately 1.5 km before it turned slightly east. Because the fieldwork identified individual trail segments, the model was employed to predict the likely route in between the segments (refer to Figure 2).

RESULTS

The seven LCP models provided information utilizing geographical factors of the natural landscape. The predicted trails that best matched the actual trail segments were those that had start and end points that were fairly close. This was evinced by the segments that were mapped in the field (Figure 4). Over longer distances, the predictions were generally less accurate. This project was designed to verify the trail route south of a known trail segment. Previous

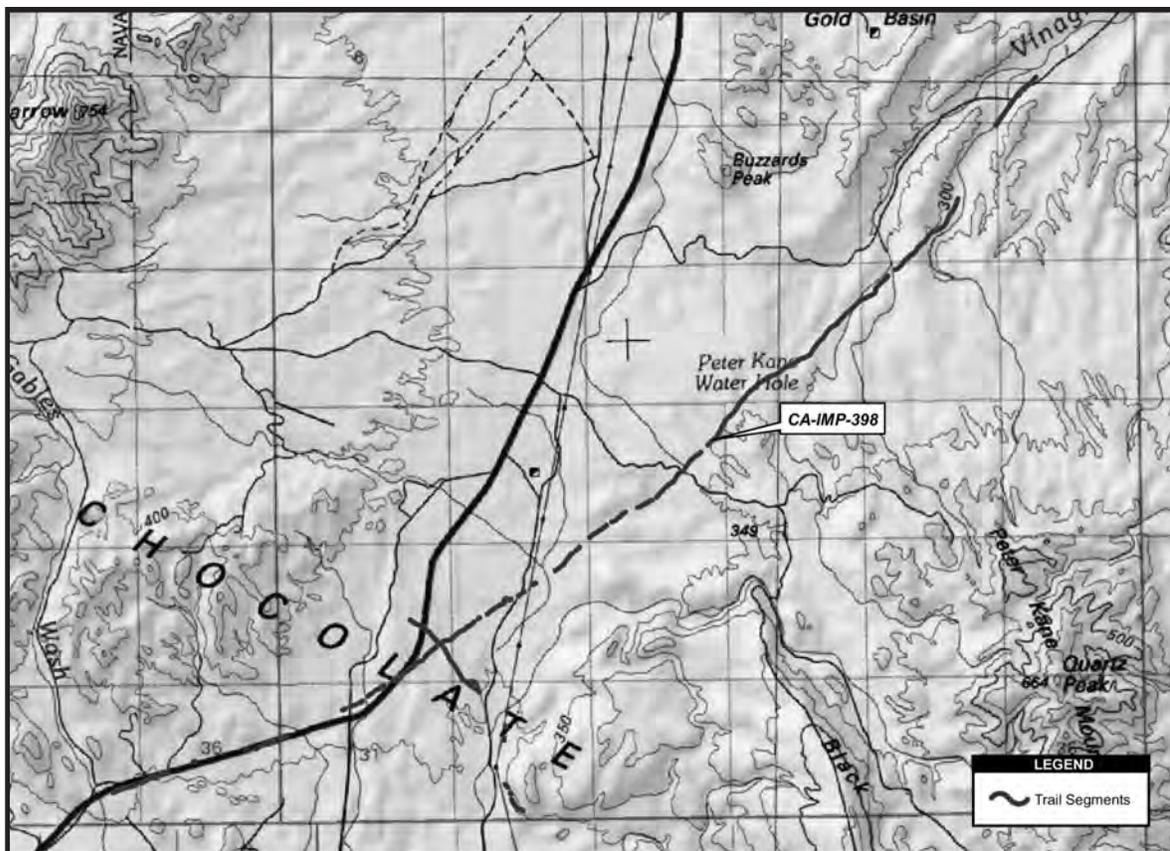


Figure 1. Trail intersecting with CA-IMP-398.

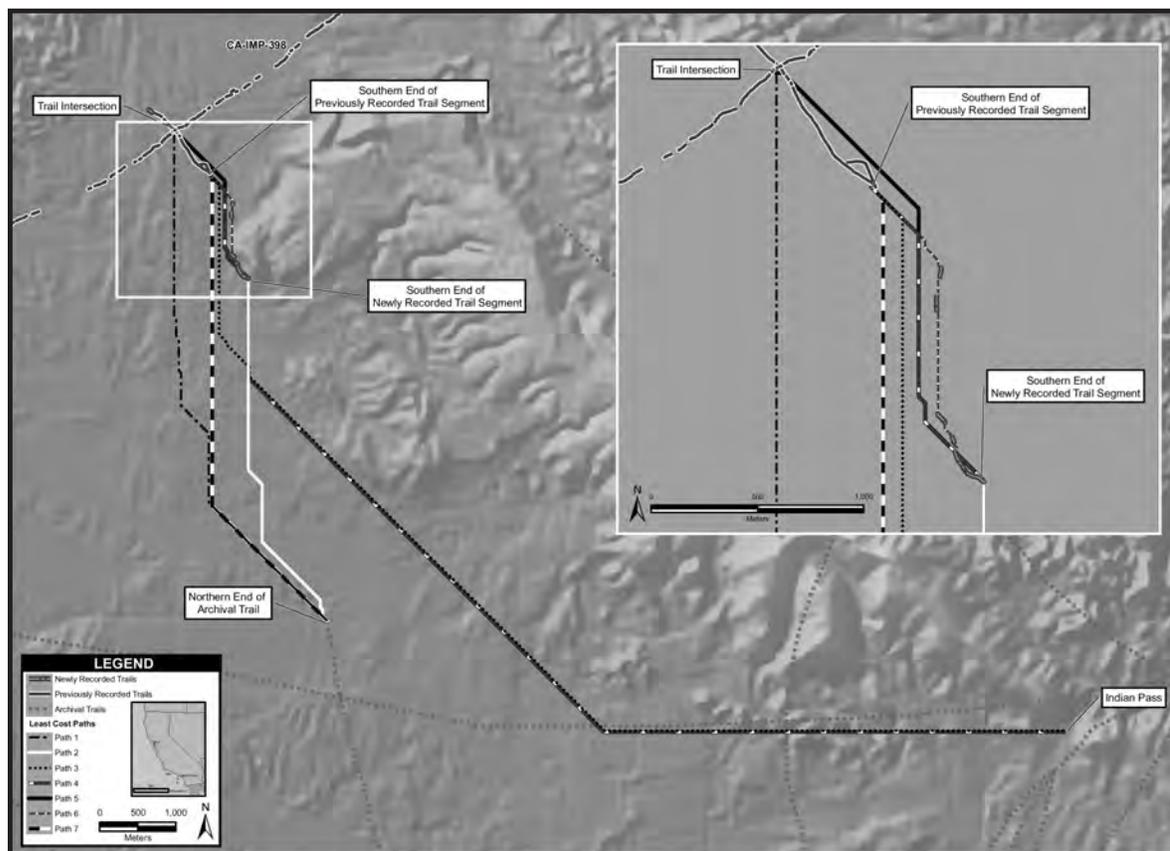


Figure 2. Least-cost paths utilized in the study.

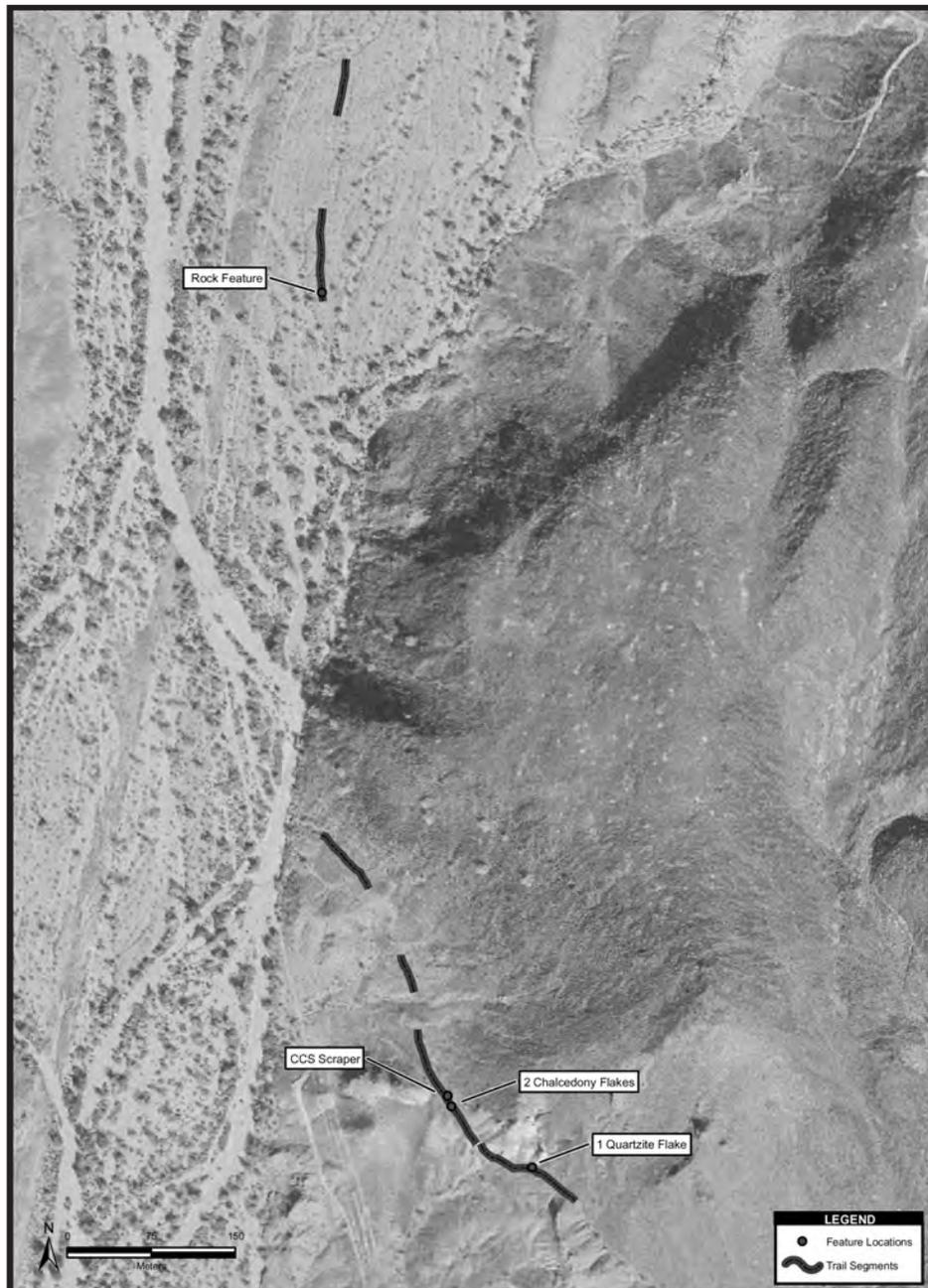


Figure 3. Resulting trail segments recorded during fieldwork.



Figure 4. A newly recorded trail segment.

efforts were unsuccessful in locating the trail on this side, but the current attempt was effective due to the consideration of geographical factors influencing the route of travel.

DISCUSSION

Previous studies employing LCP models have shown that the more constrained the topography, the better the success in predicting trail connections (Apple 2005). There is little change in the topography of the area surrounding the segment under investigation, which may account for the differences between the LCP trails and the actual trails. As an element of ongoing research, this study has provided a means by which the LCP model can benefit the documentation of prehistoric trails.

Additional investigations are needed to determine how effective the LCP model is over long distances. A GIS model is in development that factors direction into the least-cost

path, increasing the likelihood of a more accurate prediction (Barry et al. 2005). Other studies should consider locations of sites in the vicinity as well as the function of the trails when trying to model the most likely route along any corridor.

This study contributes to developing a systematic approach employing digital tools for reconstructing the prehistoric trails. The present model is most effective for linking shorter trail segments. Through GIS modeling, it is possible to combine GPS data and projected trail alignments in a GIS format to help guide preservation efforts.

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