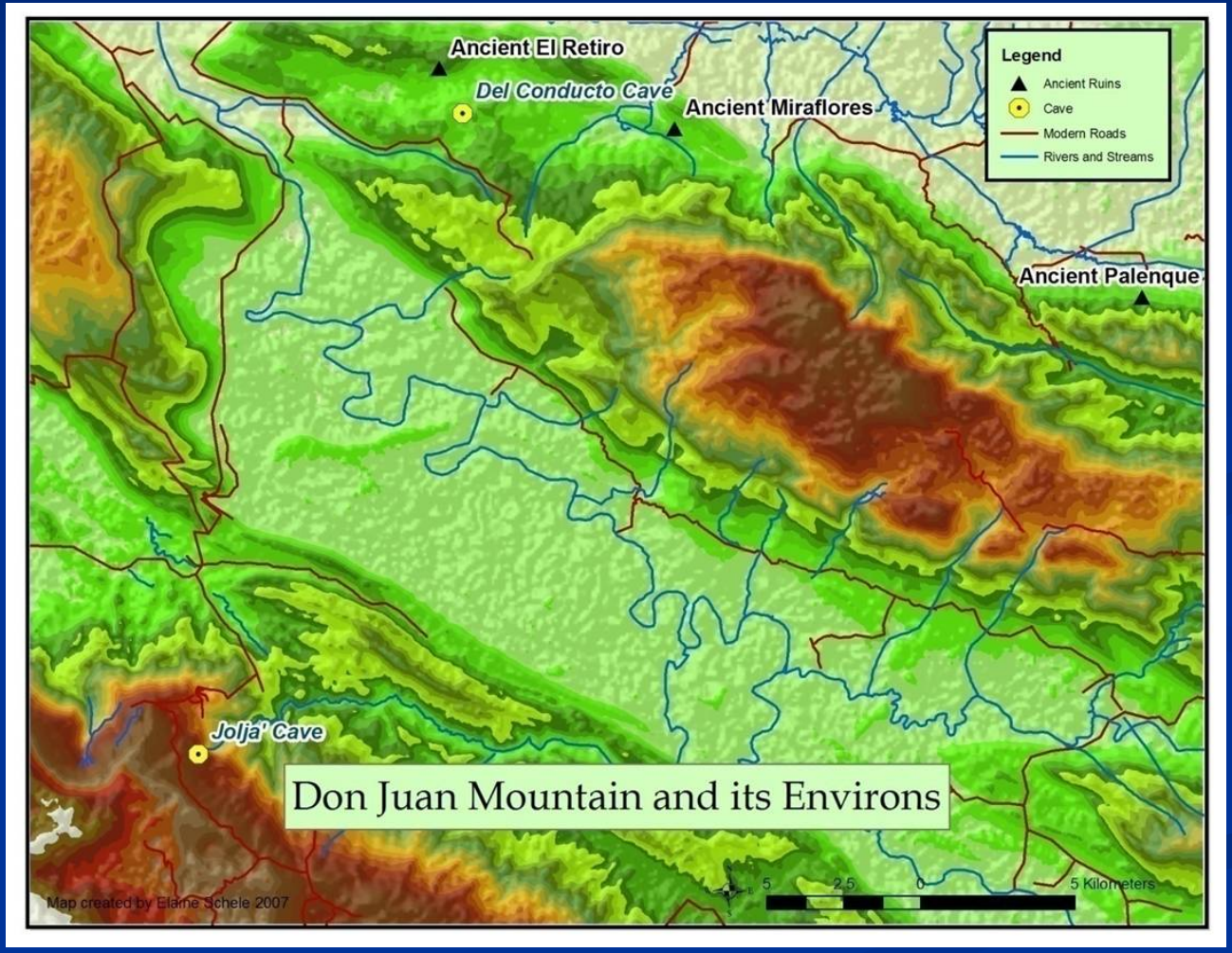
Detecting and Mapping Ancient Mountain Trails and Ritual Sites

Creating Digital Don Juan Mountain, Chiapas, Mexico

Geographic Setting

Ancient Sites and Caves



Why Caves?

Why Mountains?

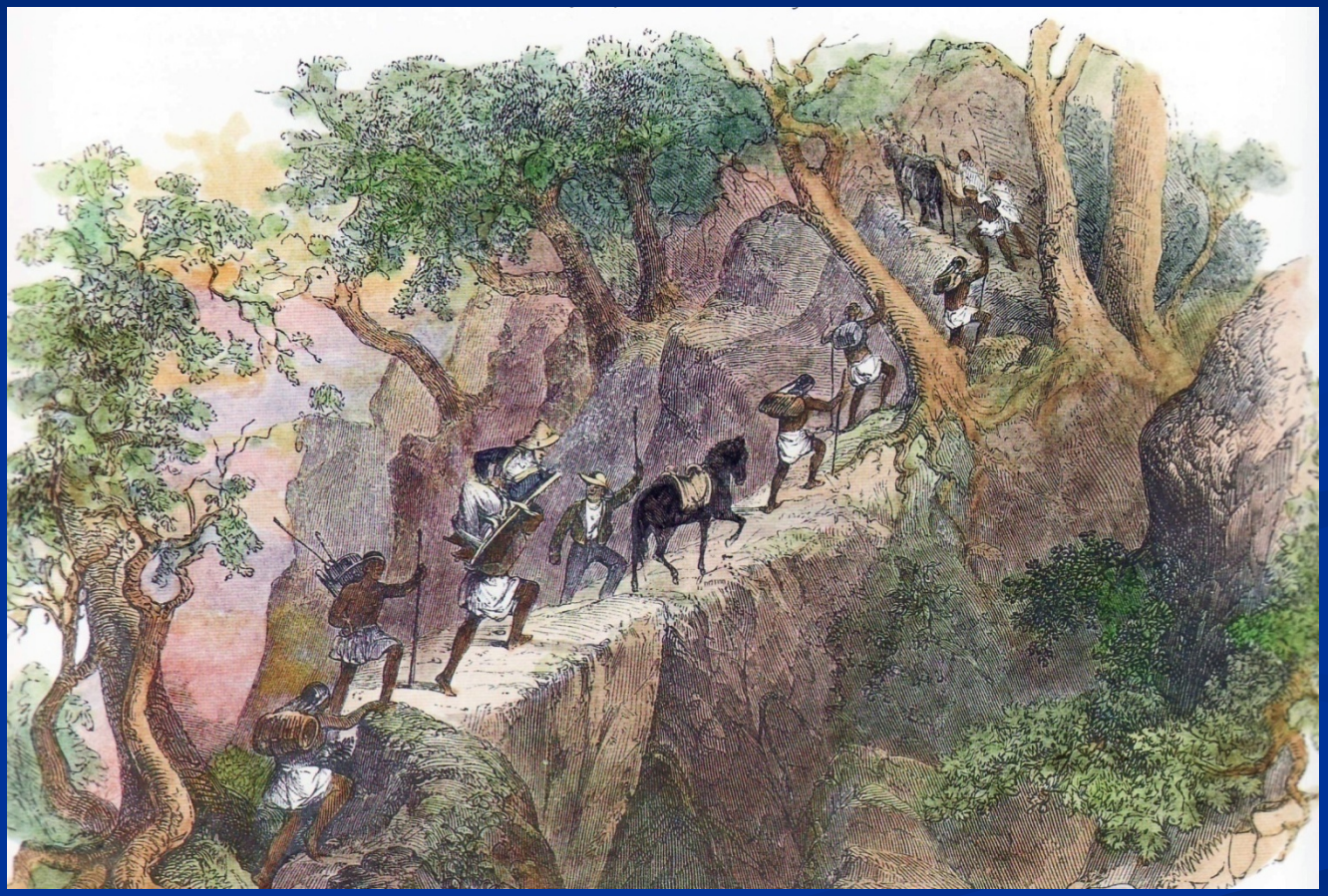
Opportunities and Purpose

- Karen Bassie-Sweet's request
- Creating a model of the mountain
- Possibility of finding landscape features that would lead to ancient trails and caves
- Digital elevation model
- Aerial photos
- Accessing paper maps to add other features
- Use of ERDIS and ArcMap

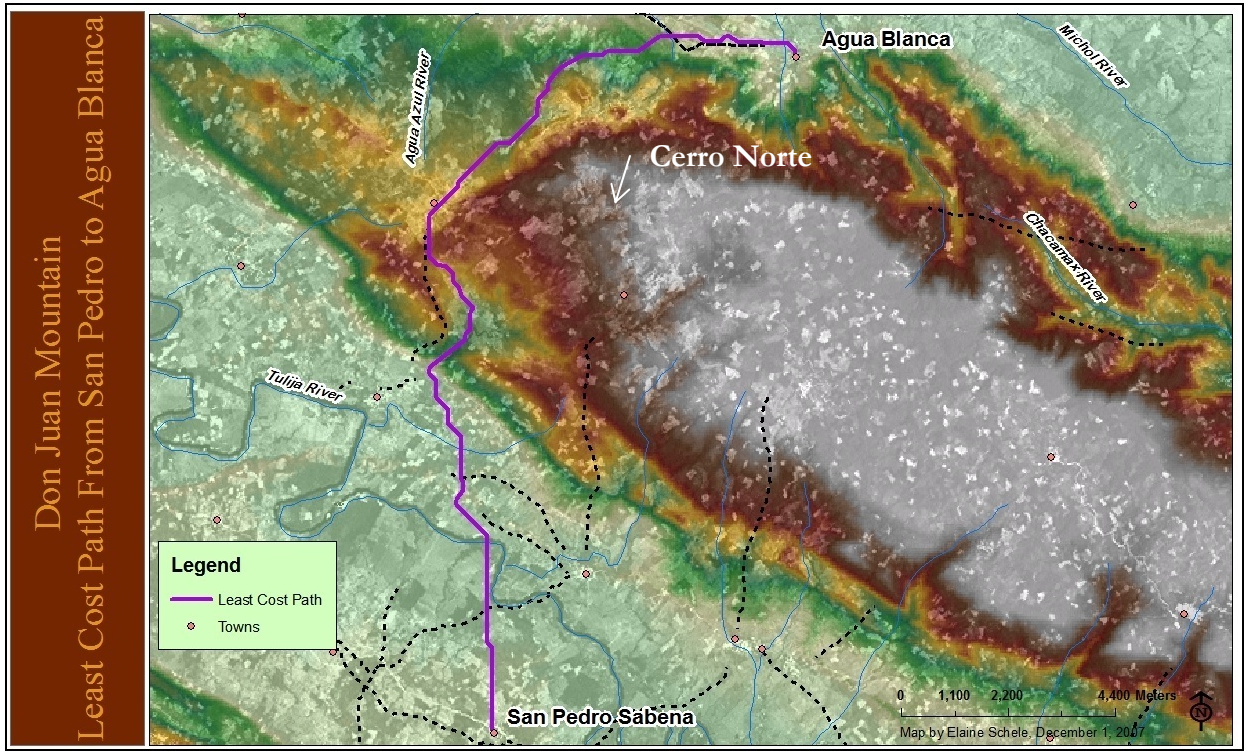
Procedures and Approaches

- The Challenge of doing GIS in Central America
- Acquiring digital data through the Internet
- Georeferencing and digitizing paper maps
- Finding, reading and incorporating historic accounts of people crossing the mountain and using the ritual circuit
- Determining which techniques to use in ERDAS and ArcMap 9.2

A Perilous Trip



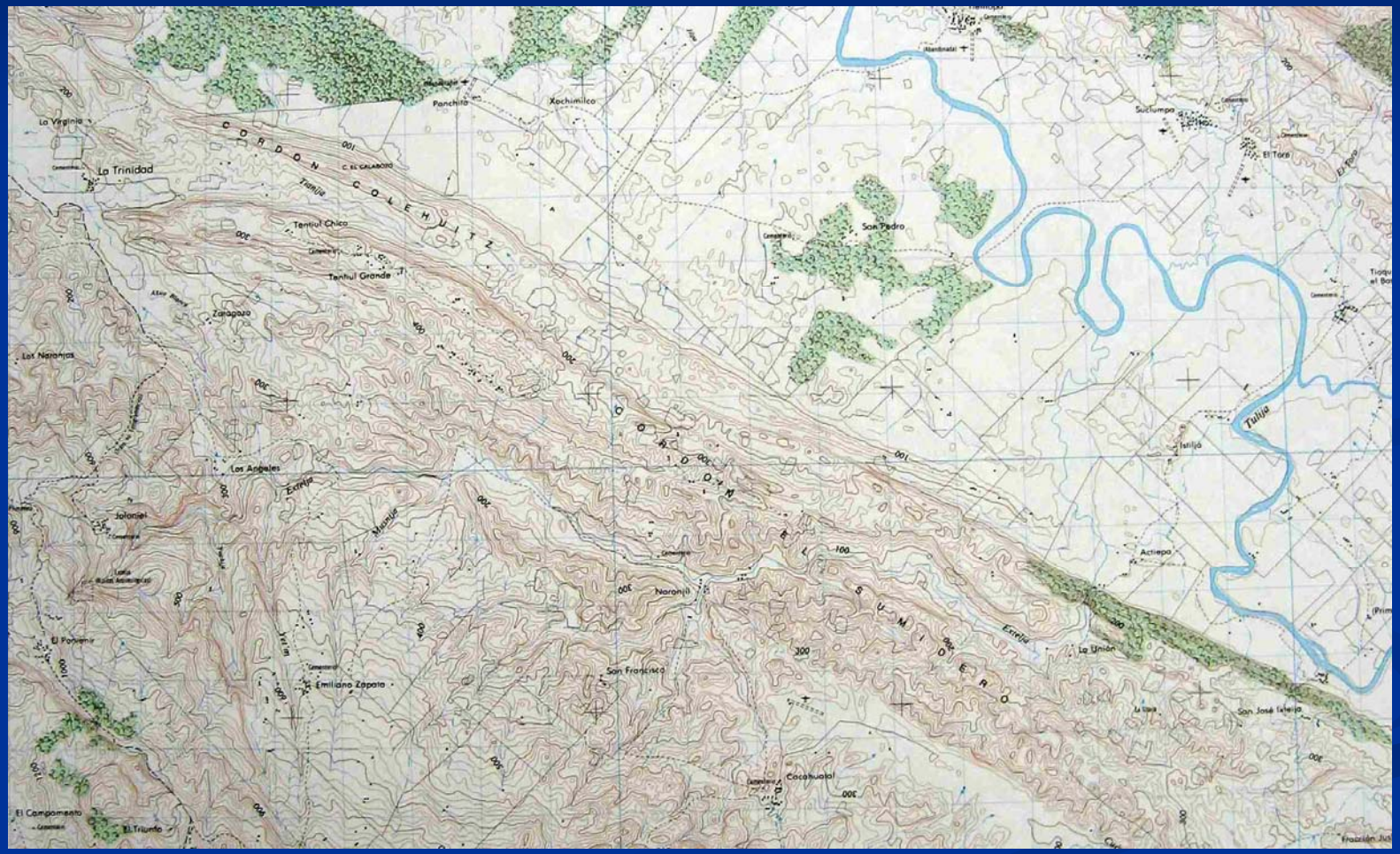
They Did Not Take the Least Cost Path



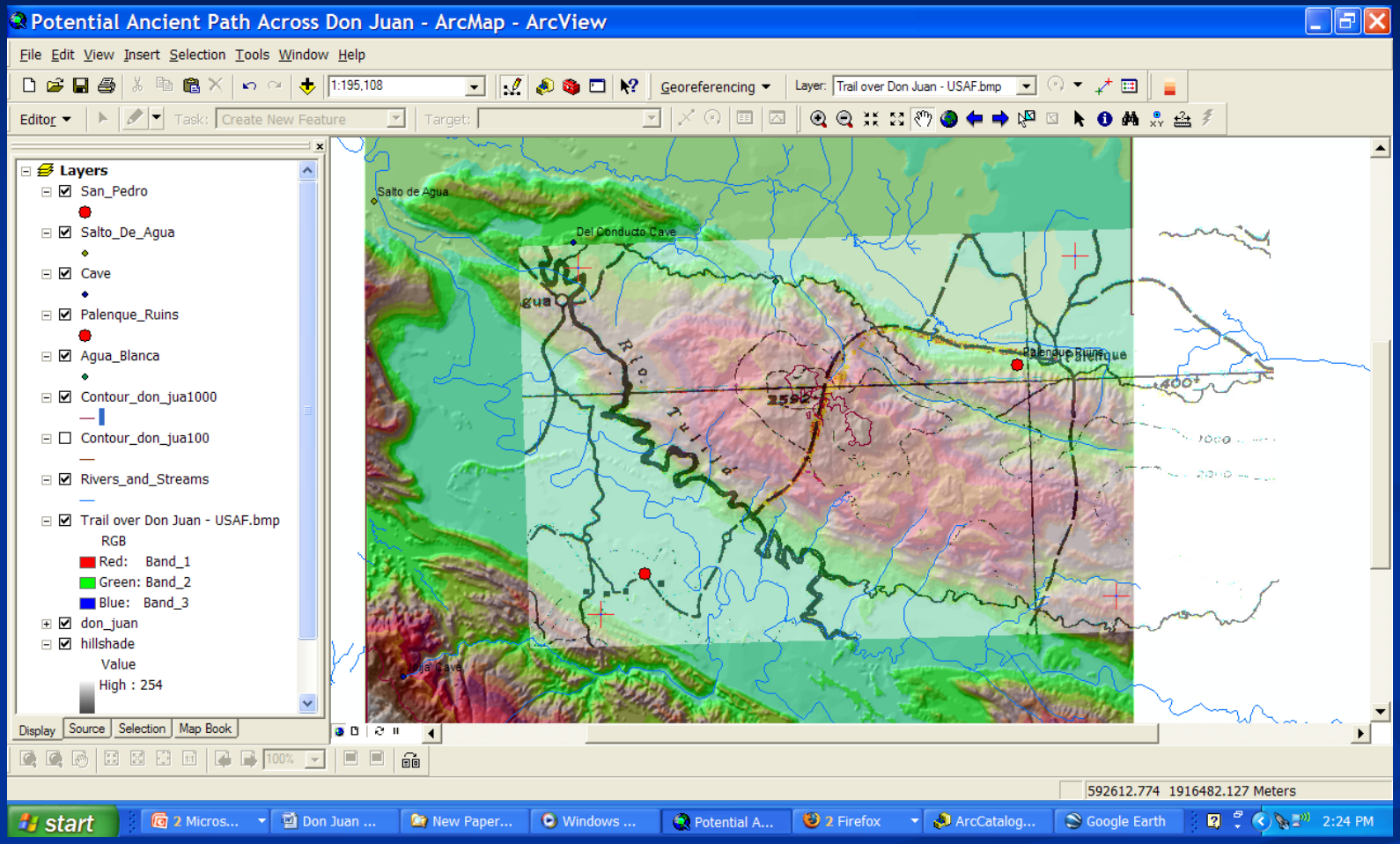
The Challenge of Paper Maps

- Finding them
- Making them digital
- Georeferencing them
- Digitizing
- Using in association with other data
- Resolving inconsistent line registrations

Example Paper Map



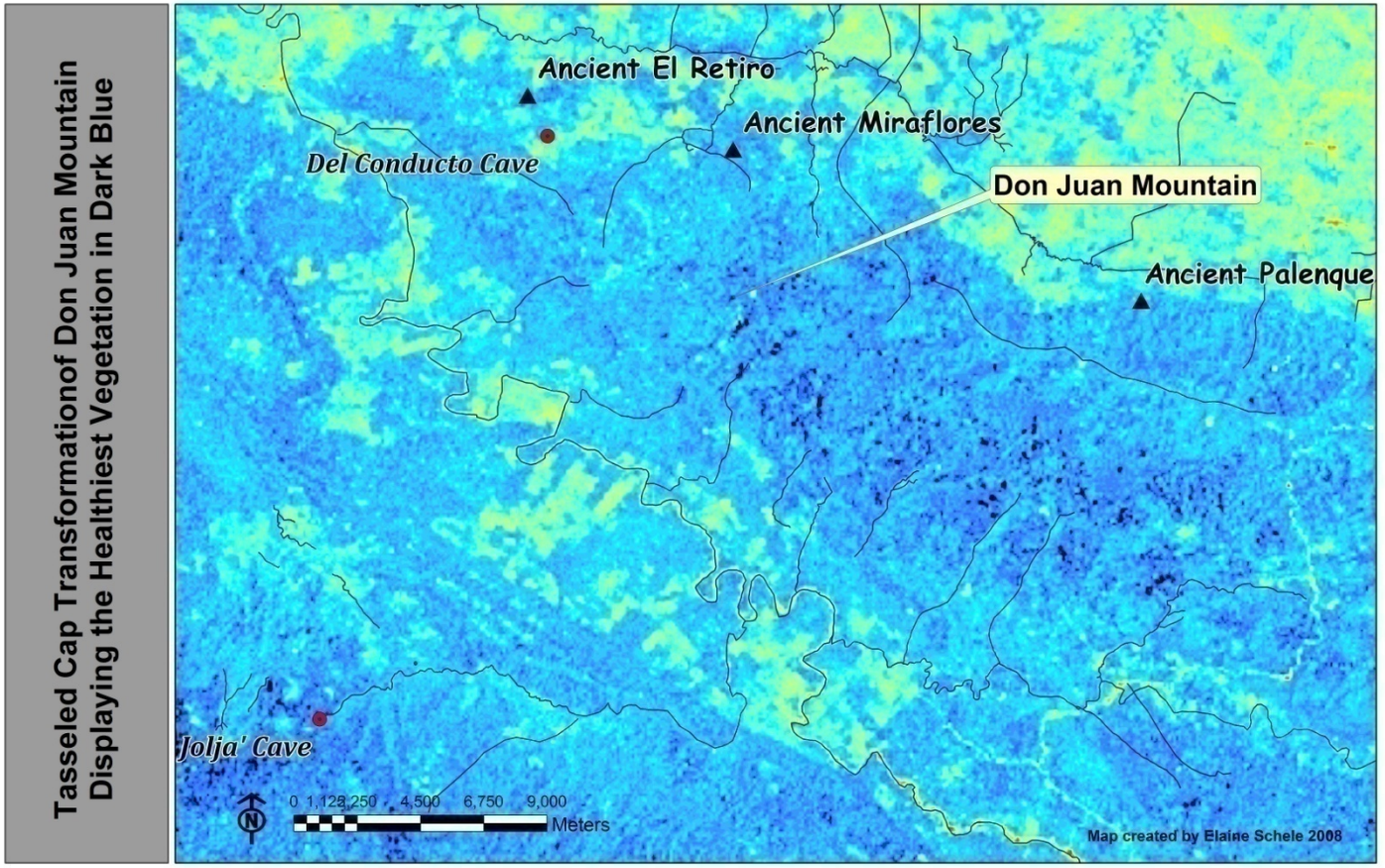
Using the Georeferencing Tool



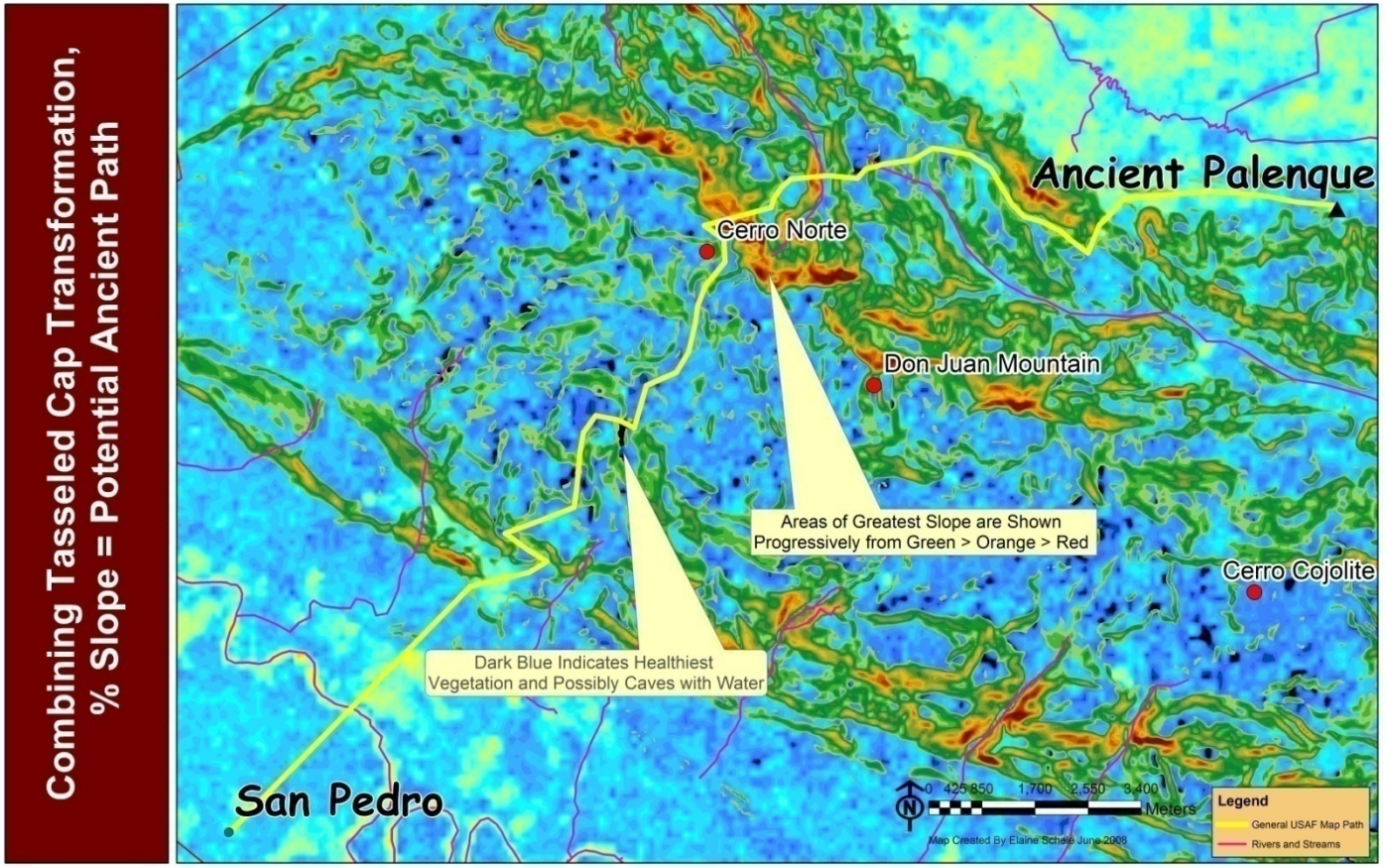
Tasseled Cap Transformation

- Used LandSat images and the ERDIS Imagine software to perform tasseled cap transformation so that the greenest vegetation would be evident
- Then manipulated the color ramp to make it stand out
- Healthiest vegetation indicates water, thus potential springs
- In a karstic environment, springs can indication the presence of caves

Where Are the Caves?



Overlaying Greenest Vegetation Raster With Slope Raster and Plotting a Course



Satellite Imagery Used With Imagine and ArcMap

- **Satellite:** Landsat
- **Sensor:** MSS
- **Path:** 21 **Row:** 48
- Swath 185 X 185 meters
- **Date Collected:** 1972 - 1992
- **Bands:** 4
- **Spatial Resolution:** 60 X 80 meters
- **Projection:** UTM, Zone 15 North
- **Datum:** WGS 1984 **Ellipsoid:** WGS 1984

Subset of Original

- **Location:** Chiapas, Mexico
- **Area:** Approx. 940 Sq. Kilometers

Other Data Used:

- 50 Meter Digital Elevation Model
- Aerial Photographs

Conclusions and Future Work

- I cannot state definitively that I have found a ritual path with associated caves on Don Juan Mountain, but I have been able to derive a very good possibility.
- This possible ancient path should be ground-truthed to determine if it is the same path used by Stephens and Catherwood, and to investigate the possibility that there might be ritual caves along it. Stephens makes no mention of any caves, however his main goal was crossing the mountain to reach Palenque, not the exploration of caves.

Conclusions and Future Work Continued…

- I have become more skilled at using the georeferencing tool so it would be helpful to re-georeference several of the paper maps and re-digitize the roads and streams
- The aerial photos have visible foot trails and I have begun to digitize them, knowing that they offer more clues to the ancient paths
- Place names are inconsistent and talking with local residents would help resolve some of these issues