

## Introduction

The purpose of this project was to determine the dates of some prehistoric earthquakes along the San Bernardino (Plunge Creek) segment of the San Andreas fault. This information will be useful for correlating other events on the San Andreas Fault on the San Bernardino segment. It is currently not known if all of the prehistoric earthquakes along the San Andreas Fault have actually ruptured the fault. If we find evidence that some of the earthquakes have not ruptured this segment, it will be able to re-examine some important interpretations of activity on this segment.

The recurrence interval for the southern segment of the San Andreas Fault is currently estimated at 144 years (Sears et al., 1997). This calculation is considering only prehistoric earthquakes that ruptured this segment of the fault. If not all prehistoric earthquakes actually ruptured this segment of the fault, the recurrence interval for this segment needs to be reevaluated.

In digging a trench and analyzing the deformation and offset of the fault, the layer that the fault broke through can be determined. Charcoal samples from various layers can be used to bracket a date on the earthquake horizon.

## The Plunge Creek Paleoseismic Site

The Plunge Creek site is located on an ancient stream channel that has been buried by the distal sediment of an alluvial fan. This trench site was chosen because at the edge of an alluvial fan, the older sedimentation layers will not be buried to great depths. A contractor had previously dug several trenches at this site along the San Andreas Fault here. We decided to re-open his trench #4 (figure 1).

A student working on her Masters Thesis, Deborah Saffare, re-opened the contractor's trench #8 to find evidence for the 1812 earthquake on this segment. This site is located on the alluvial fan, to allow the younger sedimentation units to be exposed.

## Work Completed At The Plunge Creek Site

A trench was dug in two phases, the first was 5 feet deep and the second was 10 feet deep. The trench was excavated using a backhoe, and the walls of the trench were scraped by hand to provide a vertical wall on each side. Nails, tags of various colors were used to mark off the extent of the different stratigraphic layers. The trench was surveyed using a total station, and a computer log plotter was generated. This grid was then taken back to the trench, where the data were logged by hand onto it. Charcoal samples were then collected from different stratigraphic layers as possible, to aid in later dating efforts. An earthquake horizon be found.

After phase one was finished, the trench was cut back to form benches and deepened to 10 feet. The layers were again tagged with nails and surveyed by hand and charcoal samples were collected from various layers.

After the logging was finished, both the trench wall and the logs were examined for evidence of faulting. This would include offset layers, sand fissures, and strata terminating, among other things.

## Conclusion

The trench did not reveal any clear signs of a fault running through the site. We located an ancient channel wall, and we believe that the contractor who dug the trench mistook this for a fault. We were able to locate the bottom of the trench and for further study this trench could be deepened to find evidence of past seismic events.

The other trench that was re-opened (trench #8), showed evidence of a fault. Charcoal samples were collected from layers bracketing the earthquake horizon and are currently waiting for the lab results. Trench #8 was not in the course of the trench that was scoured out the sediment in trench #4.

## References

- McGill, Sally F., 1998, Annual report, 1998: Paleoseismic studies of Fault in the San Bernardino area
- Seitz, G., Weldon, R. II, and Biasi, G. P., 1997, The Pitman Canyon record: A reevaluation of southern San Andreas fault segmentation. *Geodynamics*, v. 24, pp. 129-138.
- Suitt, S. C., 1992, Feasibility-level geological investigation, 45 acre parcel, San Bernardino County, California.