



# CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

<b>Name(s)</b> <b>Hannah N. Johnson; Hannah R. Larsen; Zachary J. Larsen</b>	<b>Project Number</b> <b>S0899</b>
<b>Project Title</b> <b>Using Fossils to Reconstruct a Miocene Ecosystem in the Barstow Formation: Year Two</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our investigation asked whether animal and plant fossils from the Barstovian Miocene period could be used to reconstruct an ancient ecosystem. We compared isolated Merychippus bones to other prehistoric horse bones from the same time period, as well as looking at other animal fossils that we found. Fossilized plant evidence was subsequently collected. This investigation is important because by revealing the environment of that particular area, we can determine climate, habitat, environmental history, and the flora/fauna present at the time.</p> <p><b>Methods/Materials</b> Over two years, we used common geologic approaches and recovered fossils from the Barstow Formation in California. Following established procedures for fossil recovery and preservation, we removed diagnostic fossils for further investigation. Recovered animal fossils were measured and compared to published measurements of the same species. Photographs of plant fossils were taken with a microscope and a measuring device. A geologist and an expert in ancient vegetation provided confirmation of the species.</p> <p><b>Results</b> Recovered animal fossils were similar to documented fossils, allowing for species identification. Bones recovered were from Merychippus, a Miocene era three-toed horse. Other Miocene-era fossils found at the site were from Pseudolauris and a camel. In year two, plant species found in the Barstow formation included Thuja, Salix Willow, Sage Wood, Maple, Pine, Elm, and Ginkgo. This was the first time that Thuja had been found here. Our results show the area was vegetated with diverse species now found in temperate areas. Our conclusion has changed from year 1 since addition of the plant species shows this was not just a simple grassland. We conclude that this ancient ecosystem contained four distinct communities.</p> <p><b>Conclusions/Discussion</b> Based on the fossil evidence, we conclude that the area consisted of four distinct communities. By comparing isolated bones to documented horse fossils we determined that the fossils found were from a Merychippus. Plant evidence included leaves, seeds, and fossilized wood of both evergreen and deciduous trees. Although the climate was likely semi-arid, plant material collected indicated that it was a diverse habitat interspersed with ponds that attracted animals for drinking. Based on the samples collected, we conclude the environment for the time consisted of savannah, riparian, marsh, highland areas.</p>	
<b>Summary Statement</b> Our work uses paleontological tools, including fossil recovery and identification, to predict what an ancient ecosystem may have looked like.	
<b>Help Received</b> We were helped by a field geologist, Robert Reynolds and a University of California-Berkeley botanist, Tom Schweich.	