

Desert Symposium 2025 April 18-21(Friday-Monday)

Dual themes: “Desert archaeology” and “Extending the Basin and Range”

Field Trip Description (led by Steve Rowland, Professor Emeritus of Geology at UNLV, and Allan Krill, Professor Emeritus of Geology at Norwegian University of Science and Technology, Trondheim, Norway)

Our 2025 Desert Symposium field trip will feature some of the amazing geology and archaeology of southern Nevada. On Saturday and Sunday nights (April 19, 20) we will be camping in a lovely group campsite in Valley of Fire State Park, which is about a 90-minute drive east of Las Vegas. Please be alerted that April 20 is Easter Sunday. Due to scheduling constraints at the Desert Studies Center, we were unable to avoid scheduling our 2025 meeting and field trip over Easter weekend. **Field trip participants will be responsible for their own food, beginning with dinner on Saturday night.** The campsite features covered picnic tables, running water, and restrooms, but no electricity.

Entrance fees and camping fees: Over the weekend we will be entering Valley of Fire S.P. twice (@\$15 per vehicle) and Lake Mead National Recreation Area (National Park Service) twice (@\$25 per vehicle). “America the Beautiful” Senior Lifetime Passes (\$80---age 62 and older) can be used for admission (including up to 4 adults in the vehicle) to LMNRA, but not to Valley of Fire S.P. The camping fee in Valley of Fire is \$25/night/vehicle (for non-Nevada vehicles). So, the total cost of entrance fees and camping fees will be \$130 per vehicle (assuming no Senior Lifetime Pass). The camping fees will probably be collected in a self-serve envelope, so bring appropriate denominations of cash. Dogs are permitted in Valley of Fire S.P., but must be on a leash. They are also permitted in LMNRA, also on a leash.

A memorable aspect of the 2025 field trip will be the inaugural performance (a staged reading and singing) on Sunday evening—at our Valley of Fire campsite—of an original, two-act musical play, *Pua’rinkan* (the Paiute name for Gypsum Cave), which is based on the true story of the excavation of Gypsum Cave in 1930. Gypsum Cave is a famous archaeo-logical and Pleistocene paleontological site that was excavated by a team of Native American excavators directed by archaeologist Mark Harrington. A widely occurring type of Great Basin projectile point—the Gypsum Point—was first discovered at this cave by Harrington. Gypsum Cave is also a sacred site to the Southern Paiute Tribe. One of the subplots of the play concerns tension between the Southern Paiutes and the excavation



project, especially with Native American excavators on Harrington's crew. Other subplots involve (1) Harrington's passionate search for evidence that humans had arrived in North America prior to the extinction of the Pleistocene megafauna, and (2) a romance that developed between the staff paleontologist, Jim Thurston, and a young Native American woman nick-named 'Birdie,' who was the niece of Harrington's wife.

On our field trip on Saturday, we will visit Harrington's 1930 campsite and the expansive, vault-like opening of Gypsum Cave (see photo above), but we will not explore the pitch-black interior of the cave. That requires a very tricky and dangerous, 5-foot vertical drop.

Most of the actors/singers in the musical will be Las Vegas folks recruited by Steve, specifically for this performance. However, Desert Symposium field trip participants will also be involved, joining in as the "excavation crew members," in the singing of some of the songs. Bring your own popcorn and camp chairs. We will have a 3rd quarter-phase moon that weekend, so a beautiful dark sky in the evening.

Below is an overview of the field trip. In addition to information from the trip leaders, participants are welcome to share their knowledge of various relevant topics at field trip stops.

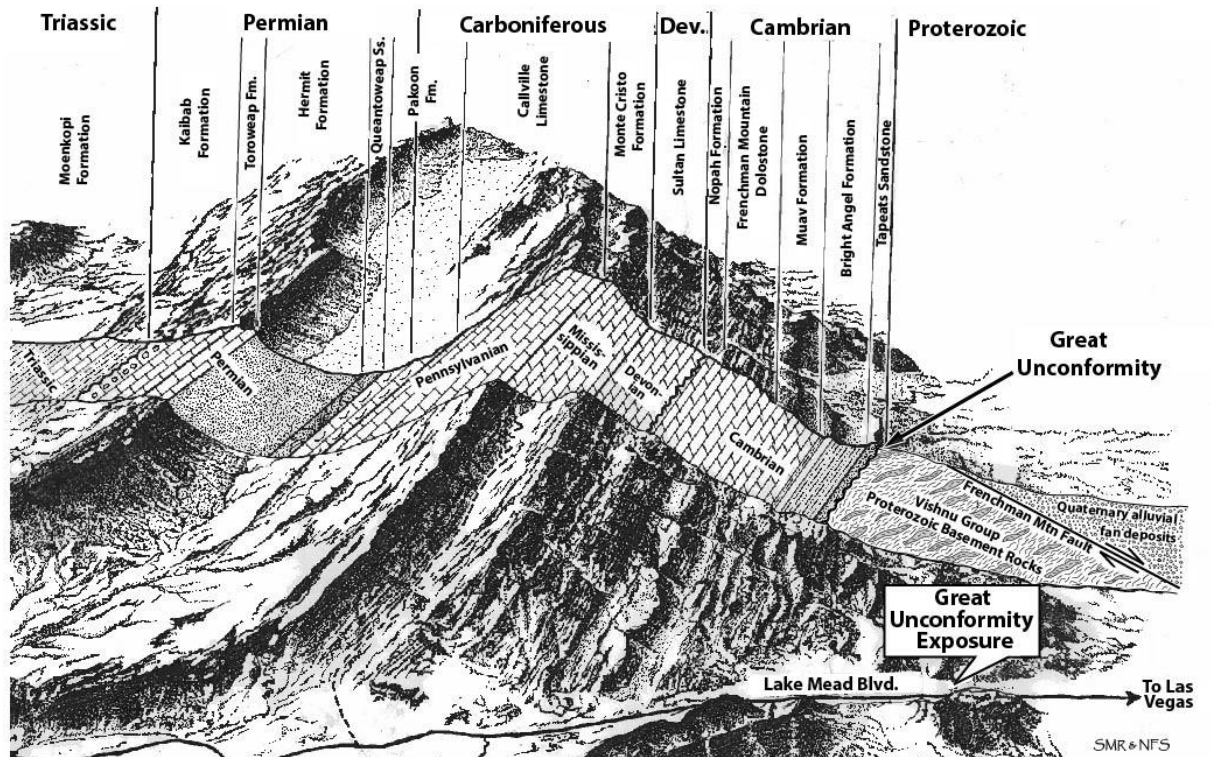
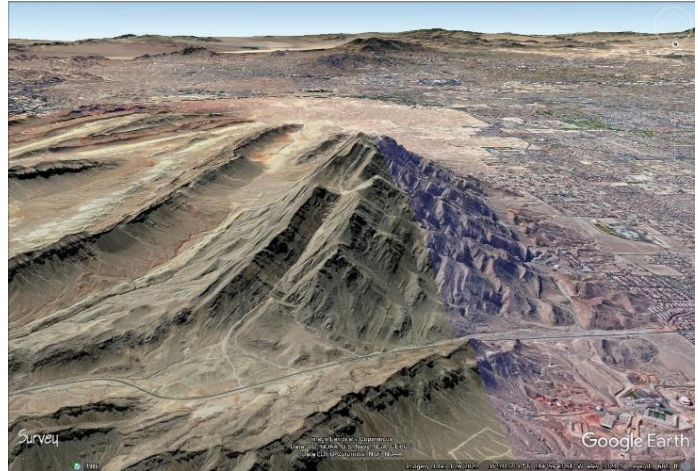
Saturday April 19

- We will leave the Desert Studies Center in the afternoon in an organized procession, and head toward Las Vegas. One field trip stop is planned along the way—a fantastic, very easily accessible slot canyon—called Spooky Canyon—eroded into alluvial fan sediments. This very easy hike will be our introduction to sedimentation associated with Basin and Range extension.
- Continue to Valley of Fire State Park (access from I-15, roughly 90 minutes east of Las Vegas).
- Make camp and eat dinner in Valley of Fire State Park; enjoy a fire in the campfire circle and learn some songs that will be sung by all of us on Sunday evening.

Sunday April 20 (car-pooling if possible—high-clearance vehicles recommended)

- Examine dinosaur tracks, petroglyphs, and Jurassic desert sand-dune deposits in Valley of Fire S.P.
- Exit Valley of Fire S.P. westward to I-15; drive (about an hour) to the eastern edge of Las Vegas Valley where we will examine a spectacular roadcut exposure of a low-angle detachment fault, typical of faults that characterize Basin and Range extensional tectonics.

- Drive a short distance eastward to near the base of Frenchman Mountain (shown in the photo on the right—view is toward the south—and the cross-section diagram below). Frenchman Mountain exposes a very thick stratigraphic section that was ripped away from the Colorado Plateau and transported about 60 km westward during the extension of the Basin and Range. We will examine an exposure of the Great Unconformity and overlying Cambrian strata and then take a short (~10 minutes) hike up a fairly steep trail to a vantage point where we can examine Proterozoic basement rocks and arm-wave about Paleozoic stratigraphy (including the recently named Frenchman Mountain Dolostone, a Cambrian unit which extends from Frenchman Mountain eastward throughout the Grand Canyon). Frenchman Mountain (together with adjacent Rainbow Gardens) is simply the single, best exposed, most accessible, continuous succession of Paleozoic, Mesozoic, and Cenozoic strata anywhere on Earth!



- Lunch in the basement (exposure of Proterozoic, garnet-bearing schist).

- Drive a short distance eastward into Rainbow Gardens (shown in the photo on the right). The prominent black peak is 'Lava Butte,' the throat of a Miocene volcano. Miocene volcanism is part of the story of Basin and Range extension.



- Examine and discuss the tectonic significance of Miocene megabreccia consisting of rapakivi granite blocks derived from exposures near Gold Butte, 60 km to the east.

- Visit campsite of the 1930 Gypsum Cave excavation and entrance to Gypsum Cave (see photo on page 1). This will involve a 15-minute hike each way, including a moderately steep slope up to the entrance to the cave (as shown in the photo on page 1).

- Drive north on Northshore Road through Lake Mead National Recreation Area to our Valley of Fire campsite (about an hour drive).

Monday April 21

- Break camp and drive eastward through Valley of Fire S.P.

- Brief stop at Visitors Center

- Exit the east side of Valley of Fire S.P.. Drive south on Northshore Road to Lovell Wash (in Lake Mead NRA)

- Spend the rest of the morning exploring the Miocene Horse Spring Formation in Lovell Wash. This formation was deposited in a basin that was created as the Basin and Range Province was being extended in the Miocene, beginning approximately 15 million years ago. We will see evidence of Miocene faulting and seismicity. These basinal sediments were deposited in lakes and streams. We will see stromatolites and fossil tracks of animals that lived in this Miocene basin. And we will walk through a slot canyon that was eroded into carbonate lake sediments, which is quite different than the Spooky Canyon slot canyon

that we explored on Saturday afternoon (which was eroded into alluvial fan sediments). We will examine and discuss the origin of a very unusual, very large (5 meters long and 1.2 meters in diameter) cylindrical sedimentary structure —called a clastic pipe (see photo below—scale is 1.5 m long), which formed when shaking associated with a very large Miocene earthquake liquified and fluidized a layer of watery silt and caused it to be forcefully injected upward through 5 m of overlying strata. The present, steeply plunging, orientation of this clastic pipe is due to folding of the strata, long after the seismic event.



- We will eat lunch in Lovell Wash. The formal field trip will end early in the afternoon, allowing Southern California-bound travelers to get home at a reasonable time. The field trip guide will also contain directions and illustrations for a self-guided stop at Hoover Dam to examine the interesting geology exposed in the walls of the canyon adjacent to the dam. Such a stop would not be far out of the way, and the geology is very relevant to the extensional tectonics (and associated volcanism) theme of the trip.