

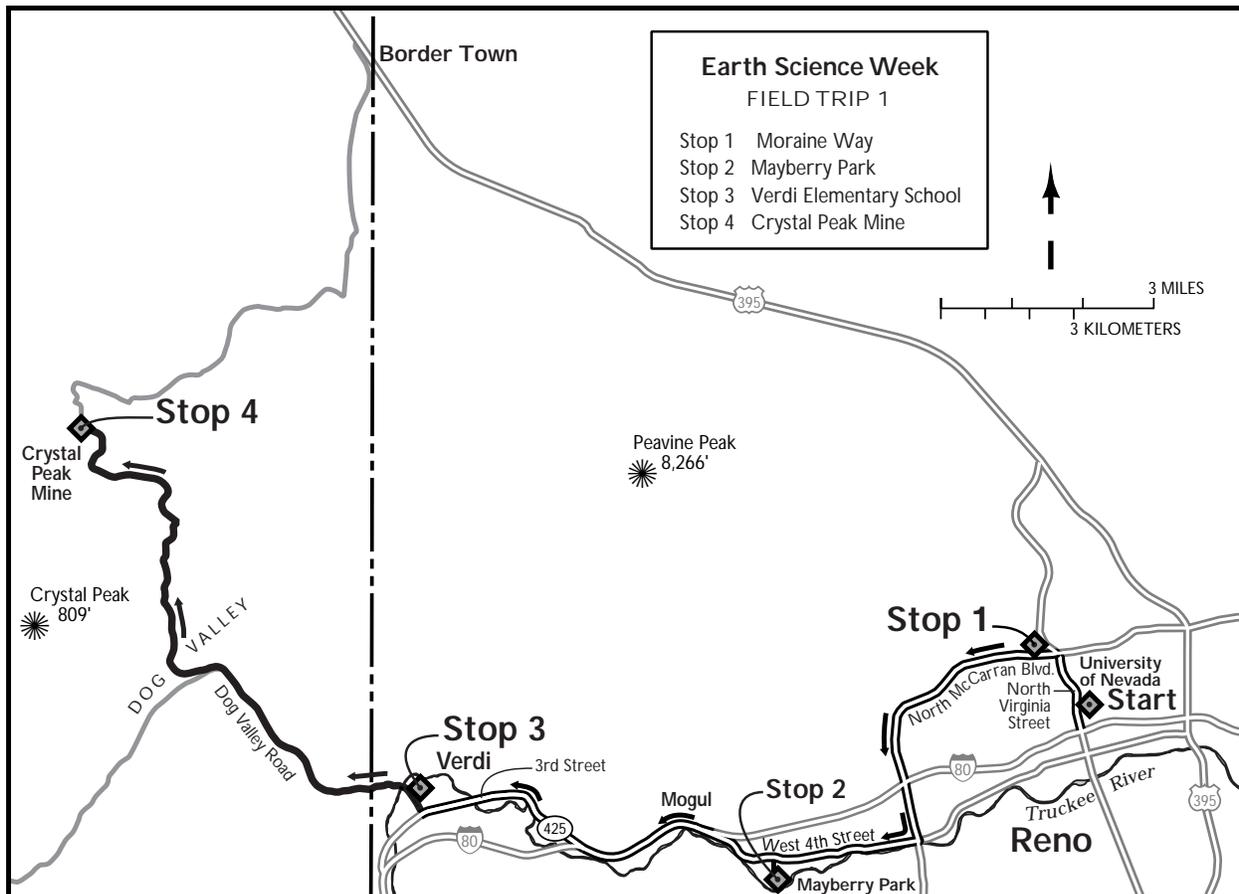
Earth Science Week 1999

Field Trip #1 for Families and Rockhounds

Turbulent Times in the Truckee Meadows

On our field trip today we will explore evidence for such catastrophic events as volcanoes, volcanic mudflows, floods, and earthquakes in the northern Truckee Meadows and surrounding areas. We will have an opportunity to collect black hornblende crystals in a dark andesitic lava flow as well as white to clear quartz crystals from a shallow hydrothermal system. We will also compare vegetation differences between stops and explore reasons for those differences.

Safety Precautions: Please be careful! We will be visiting places where there may be such hazards as broken glass, loose gravel on slopes, deep and swift-moving water, and loose rocks. Please be mindful of such potential hazards and take care of those around you, especially children. Wear eye protection and gloves if you will be breaking rocks with a hammer and make sure no one else is near enough to be injured by flying rock fragments. Do not harm any plants or animals, including the roots of trees at Crystal Peak. Dig only in already-disturbed areas. Do not dislodge any rocks on a slope where they could roll down onto someone else.



Road Log

Mileages are given in miles from the last point followed by cumulative trip mileage (e.g. 0.5/22.5 means 0.5 mile from the last point and 22.5 miles from the beginning).

- 0/0 Parking lot at Evans and Record; turn left (west) on Evans, which turns into 9th Street.
- 0.3/0.3 Turn right on North Virginia Street.
- 1.1/1.4 Cross McCarran Blvd; continue north on Virginia.
- 0.6/2.0 Turn left on Moraine Way. Head up the hill and pull over as far to the right as possible and park vehicles along the street (This is private property which we have permission to enter. Please leave no trash and be respectful to neighbors).
- STOP 1** Walk up dirt road to flat bench to view and discuss general geologic history of the Truckee Meadows. The Carson Range rises to the southwest; it is the westernmost range in the Basin and Range physiographic province. It consists mainly of granitic intrusive igneous rock that crystallized at depth in the earth's crust about 70 million years ago and has been uplifted along a range-front fault system over the past several million years. The granite is overlain by andesitic volcanic rocks. The valley and floodplain of the Truckee River lies directly to our south. The Truckee originates at Lake Tahoe and ends at Pyramid Lake, about 40 miles to the northeast. We are on the southeast flank of Peavine Mountain, which consists mainly of metamorphosed volcanic and sedimentary rocks that are Mesozoic in age. The rock where we are standing is Tertiary-age hornblende andesite, a dark volcanic rock that may contain large (1-2 cm) crystals of black hornblende in a gray matrix. The rock andesite is named for the Andes Mountains, where volcanoes of this type are common. The Cascade Mountain Range volcanoes were active here about 15 to 10 million years ago. Across Virginia Street to the east are outcrops and roadcuts of volcanic rock of similar age to that below our feet, but which has been altered to colorful, iron-oxide-stained, clay-rich rock by hydrothermal (hot water) activity. Most of the gold and silver deposits of Nevada (the nation's leading producer of both) formed from hot water activity.
- 0.6/2.6 Carefully turn vehicles around at end of road cul-de-sac and retrace route, turning right (south) on Virginia Street.
- 0.5/3.1 Turn right on McCarran Blvd.
- 1.0/4.1 Note reddish-yellow altered rock in roadcut on right.
- 0.9/5.0 Cross King's Row
- 0.8/5.8 Cross Mae Anne Blvd.
- 1.9/7.7 Turn right on 4th Street. Note large rounded boulders in cuts on the right.
- 0.6/8.3 Crossing a fault.
- 0.2/8.5 Chalk Bluff; drive slowly through this area and note, if possible the rock in the roadcuts. You can see that the layers of this sedimentary rock called the Sandstone of Hunter Creek are tilted to the east, and you can see many places where small, nearly vertical faults cut and offset the layers. The top of these faulted layers of rock has been eroded away and horizontal layers of rounded bouldery river sediments have been deposited over all.
- 1.3/9.8 Turn left on Woodland at sign for "Mayberry Park." Cross railroad tracks and continue straight south to park at the end of the road by the river.
- 0.5/10.3 **STOP 2** Mayberry Park. The Truckee River is continually adjusting the location of its channel within its floodplain. Look for evidence here of channel cutting and deposition by the river. Rivers pick up "souvenirs" of the places they travel through and leave them strewn along their course; look for these rocks to tell us what rock types the Truckee has traversed farther upstream. More water flowing down a river valley will move larger rocks; look for evidence

here of higher flow levels in the past. Compare the current environment with the past as evidenced by the Miocene-Pliocene-aged “Sandstone of Hunter Creek” visible in cuts along Steamboat Ditch above the river. (Use “restroom” here – last chance for a while!)

RETURN TO West 4th Street.

- 0.5/10.8 Turn left (west) on 4th Street, old U.S. Highway 40.
- 0.8/11.6 Old River Ranch Hot Springs area is on the left.
- 0.3/11.9 Enter Interstate 80, west. Granitic rock outcrops are on the hillside to the north.
- 0.4/12.3 The Mogul landslide is visible across the river to the south.
- 1.6/13.9 Turn off I-80 on Exit 5 – East Verdi Exit
- 0.4/14.3 The blocky, rubbly-looking outcrop on the hillside to right (near the red water tower) is a *lahar*, a volcanic mudflow deposit similar to those that flowed down channels on the flanks of Mount St. Helens during its 1980 eruption.
- 0.8/15.1 Wide turnout off road to right (brief stop possible if few cars). Series of basalt flows in roadcuts on right (under wire mesh). This basalt and the lahar deposit are interlayered with the Sandstone of Hunter Creek. The volcanic event has been radiometrically dated at 8.6 million years. The wide bend in Truckee River on the left offers good examples of a cut bank and point bar. Continue west on Old Verdi Road.
- 0.8/15.9 Cross Truckee River – narrow bridge.
- 0.3/16.2 Post Office on left – note LARGE (car-sized) boulder on right in parking lot – thought to have come down the Truckee River in a “*jökulhlaup*,” a catastrophic flood caused when an ice dam broke upstream during a glacial period more than ten thousand years ago.
- 0.5/16.7 Turn right on Bridge Street/Dog Valley Road
- 0.2/16.9 Verdi Elementary School on right
- 0.1/17.0 Turn right into parking lot at end of chain link fence.

STOP 3 Self-guided nature trail with markers at points of vegetation of interest. We are on a terrace above the Truckee River. Call Verdi Elementary School or Nevada Division of Wildlife for information on day use by class field trips.

On Dec. 29 1948, the Verdi area was hit by a magnitude 6+ earthquake. It was felt all the way from Winnemucca to San Francisco. According to Dr. Vincent Gianella at UNR, damage included toppled chimneys in Verdi, large boulders fell onto old Highway 40 in the Truckee River Canyon near the state line, and pavement cracked in the same area. Movement was probably on a northeast-trending fault west of Verdi in the Dog Valley area. Verdi experienced an earlier 6.0+ magnitude quake in 1914, and a 6.0 quake hit Truckee in 1966. Nevada ranks third in the country in the number of earthquakes, and several magnitude 7+ quakes have hit northern Nevada within the last 150 years.

Continue west on Bridge Street/Dog Valley Road.

- 0.3/17.3 One-lane bridge over Truckee River
- 0.1/17.4 Turn right on Dog Valley Road. *Next 10 miles are rough, rocky, washboard dirt road. Drive slowly and patiently and save your tires!*
- 2.6/20.0 Turn right, marked by brown U.S. Forest Service sign. The Crystal Peak Mine area is visible from this point, as the low, bare white knob to the northwest, below and in front of the darker, forested ridge on the horizon.
- 1.1/21.1 Pass “Hunt Camp #2” on the left

- 0.5/21.6 Dog Valley Guard Station – sign on right.
- 0.4/22.0 Campground on left
- 0.3/22.3 Outcrop of volcanoclastic rock (sedimentary rock composed of pieces of volcanic rock) on left.
- 1.1/23.4 Pass “Hunt Camp #4”
- 1.7/25.1 Campground on left – closest restroom facility to Crystal Peak – use it if necessary. Granitic rock outcrop on right.
- 0.2/25.3 Watch the ground and roadsides for white quartz float; crystals may be found on the surface from this area all the way up to the mine.
- 0.6/25.9 Crystal Peak Mine road on left. Road is steep and rough – you may drive up to the mine or park here and walk the last quarter mile up to the mine area.
- 0.3/26.2 **STOP 4** Crystal Peak Mine. A U.S. Forest Service volunteer guide will join us here to tell us about the history of the mine area and to explain collecting rules.

The Crystal Peak Mine area contains massive quartz composed of crystalline silicon dioxide (SiO₂) with many pockets of clear to milky quartz crystals of all sizes. It probably formed late in the crystallization of a granitic magma chamber, as quartz is one of the last minerals to crystallize as a magma cools down. The crystal pockets probably represent pockets of accumulated volatiles that allowed formation of very large crystals at relatively shallow depths in the crust. Look carefully in this area and you may also find the mineral orthoclase feldspar (KAlSi₃O₈), a pale salmon pink mineral showing near right-angle cleavage (planes of breakage). Some quartz is also coated with silvery-looking mica and blue-green copper minerals.

The quartz deposit was known by Native Americans before the advent of prospectors and settlers into this area. In 1864, the town of Crystal was laid out by the Crystal Peak Company, which owned both the mining and timber rights in the area west of the town that included the Crystal Peak Mine area. Although gold is frequently associated with quartz veins, early prospectors here were disappointed to find that the quartz here did not contain gold. In the early 1900s quartz crystals were found to vibrate at a given frequency making them useful for reliable radio communication. Prior to World War II most of the U.S. supply of quartz crystals was shipped in from Brazil. After German U-boats began to strategically sink the crystal-bearing freighters, the U.S. began a determined effort to establish a domestic supply of quartz crystals, which resulted in the development of the Crystal Peak deposit into a producing mine. Following the war years, sporadic mining of the deposit for metallurgical-grade bulk quartz continued into the early 1970s. The area is now managed as a recreational site by the U.S. Forest Service.

Thank you for helping us celebrate Earth Science Week, which has been officially designated as the second full week of October by Governor Kenny Guinn, and is a nationwide recognition of the importance of geology and the other Earth sciences to society. This field trip is sponsored by volunteers from the Nevada Bureau of Mines and Geology, Department of Geological Sciences, and W.M. Keck Museum at the Mackay School of Mines, University of Nevada, Reno; Desert Research Institute; Nevada Division of Minerals; Geological Society of Nevada; American Institute of Professional Geologists; Association of Engineering Geologists; Nevada Paleontological Association; Nevada Petroleum Society; Society for Mining, Metallurgy, and Exploration; U.S. Geological Survey; U.S. Bureau of Land Management; U.S. Forest Service; and Nevada Mining Association.

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