Earth Science Week 2000

Geology along America's Loneliest Highway

A Field Trip for Families and Rockhounds

We will make five geological stops and a couple of rest stops along U.S. Highway 50 between Carson City and Sand Mountain. We will be examining evidence for evaporating seas, ancient lakes, and volcanoes in western Nevada.

*Much of this road log is excerpted from a recent NBMG publication, **"Traveling America's Loneliest Road, a Geologic and Natural History Tour through Nevada along U.S. Highway 50**," by Joseph V. Tingley and Kris Ann Pizarro. It includes comprehensive descriptions of geology, history, landforms, vegetation, and animals along the length of U.S. Highway 50 across Nevada. The complete book is available for sale at NBMG Publication Sales Office by telephone (784-6691 x2), by the Web (www.nbmg.unr.edu/sales.htm), or on the UNR campus, room 310, SEM, between 7:30 a.m. and 2:30 p.m., Monday through Friday.*

Mileages are cumulative, resetting to zero after stops where irregular terrain may result in variations in mileage. Vehicle odometers may differ, so keep track of landmarks and lead vehicles.

0.0 Leave from the east (main) parking lot at Western Nevada Community College at the end of West College Parkway in Carson City at 9:00 a.m.

1.0 Turn right (south) on Carson Street (U.S. Highway 395)

2.3 Note descent down small hill, which is an expression of a fault scarp that crosses the road at approximately the location of the Best Western Motel. Geologists believe there has been movement on this fault within the past 500 years, underscoring the need for earthquake preparedness in Carson City and nearby areas.

2.4 Turn left (east) onto Williams Street, U.S. Highway 50. (At this point, we join the road log in the book "Traveling America's Loneliest Road" at mile 11).

2.9 Opposite Mills Park on the right, the crest of the Virginia Range on the skyline to the north (left) is capped by red and black basaltic cinder deposits, which are mined to supply "lava rock" landscaping material for the surrounding area.

5.8 Pass Akron Road on the right and a historical marker describing the Carson mills, water-powered mills that were built along the Carson River in the 1860s and 1870s to process the rich silver ore mined from the Comstock Lode at Virginia City.

6.8 Near the crest of the hill, U.S. Highway 50 cuts through outcrops of black basaltic volcanic rock (relatively silica-poor rocks that tend not to erupt as violently as rhyolites). These rocks are closely related to the active extension (pulling-apart) of the earth's crust in the Great Basin.

7.8 Lyon County Line. Watch for "Carson Highlands Self-Storage" sign on left, followed by a chain link fence with "Tahoe Pool" sign. Get in the left turn lane.

8.0 **Turn left on Linehan Road** toward Mound House.

8.1 The operation on the right is a concrete batch plant operated by American Readymix.

8.9 Turn left at "Art Wilson" sign and proceed northwest to the mine.

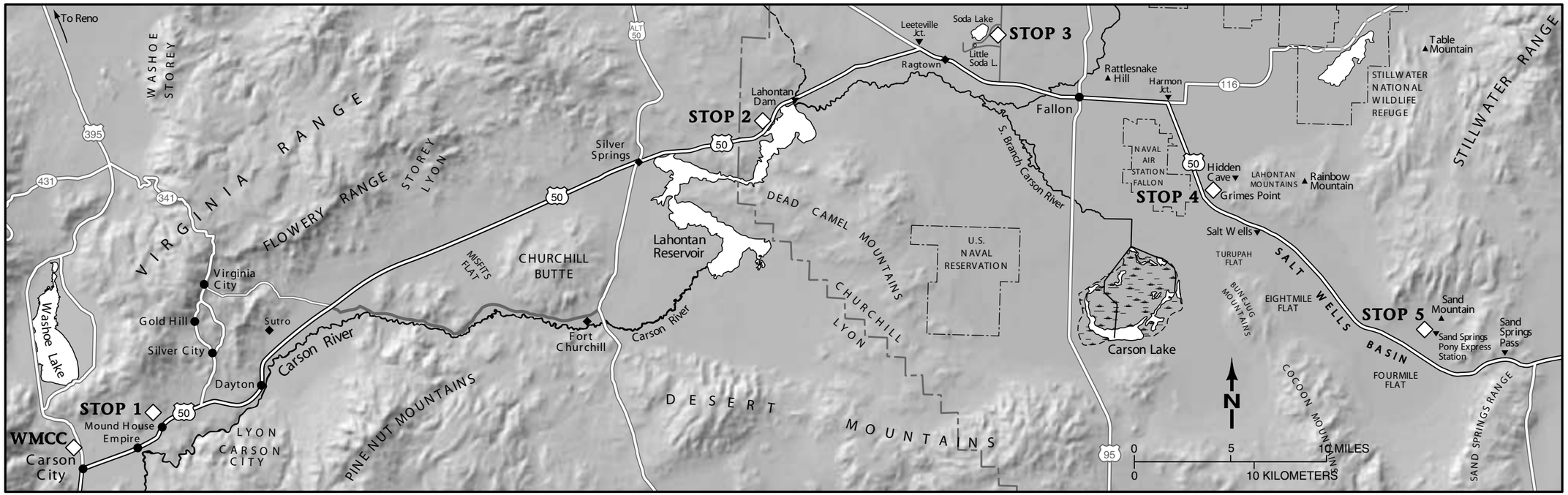
9.2 **STOP 1. ART WILSON COMPANY'S ADAMS GYPSUM MINE**.

Stop at the scale house and park on the left where we will meet Mr. Ken Schmick, who will take us on a tour of the gypsum mine and crushing facility.

Please be very careful in the mine area and keep your children with you at all times. Mr. Schmick will tell us where we are allowed to collect samples of gypsum, anhydrite, limestone, and volcanic rock.

Gypsum ($CaSO_4 \cdot 2H_2O$) is a versatile mineral commonly mined for use as plaster for sheetrock or wallboard, as a drying retardant in cement, and as a soil amendment in agriculture. Nevada is one of the top gypsum-producing states in the country, steadily increasing its production over the past fifteen years. The Adams Gypsum Mine first operated from about 1914 to1920 with an aerial tram from the mine to a plaster plant on the V&T Railroad. The Art Wilson Company has operated the Adams Mine continuously since the 1960s, and produced 145,447 tons of gypsum in 1999, mainly for use in agricultural applications and cement in California and Oregon.

The deposit is a bedded gypsum-anhydrite probably formed in a shallow offshore evaporative marine basin deposit about 150 million years ago (Jurassic age). Anhydrite ($CaSO_4$) is somewhat denser and darker in color than the gypsum and occurs in the lower portions of the pit. The deposit is overlain by light buff-colored limestone ($CaCO_3$).


To Reno
WASHOE
STOREY
VIRGINIA RANGE
FLOWERY RANGE
STOREY
LYON
395
431
341
50
ALT 50
Washoe Lake
Virginia City
Gold Hill
Sutro
Silver City
Dayton
Carson River
STOP 1
Mound House
Empire
WMCC
Carson City
LYON
CARSON CITY
PINE NUT MOUNTAINS
MISFITS FLAT
CHURCHILL BUTTE
Fort Churchill
Silver Springs
STOP 2
Lahontan Dam
Lahontan Reservoir
Carson River
DEAD CAMEL MOUNTAINS
CHURCHILL
LYON
DESERT MOUNTAINS
U.S. NAVAL RESERVATION
Leeteville Jct.
Ragtown
Soda Lake
Little Soda L.
STOP 3
Fallon
S. Branch Carson River
Rattlesnake Hill
Harmon Jct.
116
NAVAL AIR STATION FALLON
Hidden Cave
Grimes Point
STOP 4
LAHONTAN MOUNTAINS
Rainbow Mountain
Salt Wells
TURUPAH FLAT
BUNEJUG MOUNTAINS
EIGHTMILE FLAT
SALT WELLS BASIN
FOURMILE FLAT
COCOON MOUNTAINS
Carson Lake
95
STOP 5
Sand Mountain
Sand Springs Pony Express Station
Sand Springs Pass
SAND SPRINGS RANGE
STILLWATER NATIONAL WILDLIFE REFUGE
Table Mountain
STILLWATER RANGE
N
0 5 10 MILES
0 10 KILOMETERS

Retrace the route back to U.S. 50, reset your odometer to zero and turn left (east).

Note: There are no rest stops scheduled for the next 35 miles. If you need to make a quick rest stop at a gas station, market, etc., please rejoin us at the next stop at the Lahontan State Recreation Area, North Shore Marina, 35 miles beyond Mound House.

0.5 Mound House historical marker on left. Mound House was originally constructed in 1871 as a supply station and siding on the Virginia and Truckee (V&T) Railroad. It thrived after the construction of the Carson & Colorado narrow gauge railroad that ran from here to other mining camps.

1.8 Pass State Route 341 to Virginia City on left.

5.3 Traffic light in downtown Dayton, site of the first gold discovery in Nevada in 1849 and possibly the oldest settlement in Nevada. Nevada now leads the nation in gold and silver production and accounts for about 10% of current world production of gold. Nevada mines produce well over $2.5 billion in gold annually.

6.0 On the left are the remains of the old Rock Point Mill, built in 1861 to treat gold ore from Gold Hill.

7.5 Due north of here, behind the trees at the base of the hills, is the mouth of the Sutro Tunnel, which was driven through the rock under the mountains to Virginia City to drain hot water from the mines in the 1870s. The 4-mile-long tunnel was successful in its purpose, but took so long to complete that the rich silver ore had played out by the time it was finished. The long low bench of buff and gray material visible to the north just above the roofs of the subdivision is composed of the rock removed during construction of the tunnel.

9.0 A lightweight rhyolite aggregate quarry, visible to the north at 11 o'clock, supplies one of the components needed to make concrete building blocks in Carson City. In recent years, construction materials such as crushed rock, sand, and gravel compete annually with silver for second place in total value of mined materials in Nevada.

14.3 Road cut exposes granitic rock cutting older Triassic metamorphic rocks. These are similar to the metamorphic rocks which host the Dayton iron deposit, visible as some red-stained rocks on a small hill north of the highway at about 10 o'clock. First discovered in 1903, it was drilled in the 1950s and found to contain about 45 million tons of iron ore, but at a time when demand for iron was waning.

15.6 Iron Mountain Ranch subdivision (on left) is aptly named for the Dayton iron deposit.

20.0 Stagecoach

28.6 Silver Springs – Junction with U.S. Alt. 95. Continue straight on U.S. 50.

29.5 Small gravel operation on the left. Shorelines of Pleistocene Lake Lahontan are etched into the black hillsides straight ahead.

33.6 When you crest the hill, Lahontan Reservoir is visible ahead. For the next mile or so, there are reddish volcanic outcrops to the north (left) across the railroad tracks.

34.5 Churchill County Line

36.0 Turn right into parking lot of Lahontan State Recreation Area – North Shore Marina Area.

STOP 2. LAHONTAN RESERVOIR. Brief rest stop

Even before the construction of Lahontan Dam, Lahontan Reservoir was one of only a few remnants of ancient Lake Lahontan, a huge glacial lake that occupied much of the lower parts of northwestern Nevada and neighboring states during the Pleistocene Epoch until as recently as about 10,000 years ago. Other remnants include Pyramid Lake, Humboldt Sink, and Carson Sink.

Proceed northeast (right) toward Fallon.

37.3 Lahontan Dam visible to right.

45.5 Leeteville Junction. Junction with U.S. Alt. 50. **Turn right**

50.7 **Soda Lake Road. Turn left on Soda Lake Road**.

52.7 **Turn left on Cox Road**

54.3 **Turn right** on an unmarked gravel road, drive up a small hill past junk pits to edge of Soda Lake. Park carefully so as not to block others.

STOP 3. SODA LAKES

Soda Lake and Little Soda Lake are two young volcanoes, younger than the sediments that were deposited in Lake Lahontan. Geologists call these types of volcanoes maars (pronounced "Mars"), so after this stop you can say that you "have been to maars." The maars are broad, low-relief, nearly circular volcanic craters. They probably formed when magma rose close to the surface, boiled the groundwater, and caused an explosive eruption of basaltic magma through the wet sediments of the lake basin. You can find telltale “basaltic bombs” around the margins of the craters. Look for small crystals of plagioclase feldspar (clear to white), olivine or peridot (green) or pyroxene (brownish black) in these dark vesicular volcanic rocks.

Retrace route back to U.S. 50 (reset odometer to zero) and proceed east (left).

4.5 Cross Maine Street, downtown Fallon. Continue east.

14.0 Turn left to Grimes Point Archaeological Site – brief rest stop. Prehistoric natives scratched petroglyphs in boulders of andesite lava flows along the shores of the Pleistocene Lake Lahontan. The boulders are coated with rock varnish, a thin layer of dark brown to black iron and manganese oxides. The U.S. Bureau of Land Management has constructed a path along which you can view the petroglyphs on another visit following today’s field trip. Do not disturb the petroglyphs or collect rocks at this site. Continue north on the dirt road beyond Grimes Point. Drive about 2 miles (passing Indian Cave on the right), bear right at a fork in the road, and follow trip leaders into gravel pit area. Park vehicles.

STOP 4. GRIMES POINT WONDERSTONE LOCALITY

Lake Lahontan reached its highest water levels at least four times between 75,000 and 10,000 years ago. We can see here abundant evidence for this lake, such as shorelines carved by wave action and sediments deposited in the lake. Look carefully in the gravels of the pit area for pebbles of Nevada wonderstone that were tumbled and polished by streams and by wave action along the shore of the lake about 13,000 years ago. This volcanic rock is a rhyolitic air-fall tuff, material ejected from a volcano about 12 million years ago. The rock was altered by hot waters that deposited pyrite (FeS_2) and quartz (SiO_2). Rainwater penetrated the rock and oxidized the pyrite to form liesegang bands of red hematite (Fe_2O_3) and orange and brown goethite ($FeO(OH)$). Erosion broke pieces of the rock from its outcrop, and streams carried pebbles to the shore of Lake Lahontan. The hydrothermal fluids that initially altered the volcanic rock were much like waters in modern hot springs, which are common in Nevada. Such hot waters are used by geothermal power plants to produce electricity. Nevada annually produces about $110 million worth of electricity from geothermal power plants. This type of hydrothermal alteration is also commonly associated with the gold and silver deposits that have been so important to Nevada throughout its history.

Retrace route back to U.S. 50, reset odometer to zero and turn left (east).

16.6 Turn left at sign for Sand Mountain Recreation Area. Turn left again at sign to Sand Springs Pony Express Station.

STOP 5. SAND SPRINGS PONY EXPRESS STATION.

Clearly visible to the north, Sand Mountain is composed of clean fine sand winnowed by wind action over thousands of years from the lakebed sediments of Pleistocene Lake Lahontan. Note the position of the dune hugging the northeast side of the huge lake basin, where the prevailing winds from the southwest lost velocity as they rose over the mountains behind the dune, lost energy, and dropped some of their load of sand at the foot of the mountains. Continued winds constantly reshape the dune, healing the temporary scars left by the off-road vehicles that frequent the huge dune.

Sand Springs Pony Express Station, buried by the shifting sands for more than 100 years, was excavated by archaeologists beginning in 1976. Note the building materials used in the construction of the station; using knowledge you have gained on the field trip, can you identify the materials?

The formal field trip ends here at Sand Mountain. Return to U.S. 50 and find your way home, or continue on your own! We hope you enjoyed the trip and that we have whetted your curiosity enough to continue exploring with further geological expeditions along U.S. 50 and other parts of Nevada.

Thank you for helping us celebrate Earth Science Week, which has been officially designated as the second full week of October by Nevada Governor Kenny Guinn, the U.S. Congress, and the Association of American State Geologists to recognize the importance of geology and other Earth sciences to society. This field trip is sponsored by the Nevada Bureau of Mines and Geology, and by other geoscience agencies and organizations in northern Nevada. If you have any questions about the geology, natural hazards, or mineral, energy, or other natural resources of Nevada, please feel free to contact the Nevada Bureau of Mines and Geology by telephone (784-6691), e-mail (info@nbmg.unr.edu), or the Web (www.nbmg.unr.edu), or visit the NBMG offices on the UNR campus between 7:30 a.m. and 2:30 p.m., Mon-Fri.

Prepared by D.D. La Pointe, Nevada Bureau of Mines and Geology, September 2000.

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