



Supplemental road log 4: From intersection of NM-53 and Forest Road 50 (near Bandera Crater) to Grants via Forest Roads 50 and 49

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1989, pp. 73-75. <https://doi.org/10.56577/FFC-40.73>

in:

Southeastern Colorado Plateau, Anderson, O. J.; Lucas, S. G.; Love, D. W.; Cather, S. M.; [eds.], New Mexico Geological Society 40th Annual Fall Field Conference Guidebook, 345 p. <https://doi.org/10.56577/FFC-40>

This is one of many related papers that were included in the 1989 NMGS Fall Field Conference Guidebook.

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- 1868 it was designated Fort Wingate for Captain Benjamin Wingate, who died of wounds received in the Battle of Valverde south of Socorro in 1862. **0.1**
- 23.4 Entering business district of modern Fort Wingate. **0.4**
- 23.8 Fort Wingate High School on left. **0.4**
- 24.2 On left of 9:00–12:00 note cuesta with good exposures of lower Petrified Forest Mbr capped by Sonsela Ss Bed on Chinle. **0.6**
- 24.8 Milepost 9. **0.4**
- 25.2 Fort Wingate cliffs ahead along the north side of I-40

- expose in ascending order, the red Entrada Ss, the very thin, white band of Todilto Ls, the Beclabito Mbr of the Wanakah, the light-colored Cow Springs Ss and the Morrison Fm. A thin, generally cliff-forming Dakota Ss caps the section. **0.4**
- 25.6 Gravel pit on left; road on alluvial plain of south fork of Puerco River. **0.5**
- 26.1 Eastbound I-40 on-ramp to right; Albuquerque to right; Gallup to left just ahead.

End of Supplemental Road Log 3.

SUPPLEMENTAL ROAD LOG 4, FROM INTERSECTION OF NM-53 AND FOREST ROAD 50 (NEAR BANDERA CRATER) TO GRANTS VIA FOREST ROADS 50 AND 49

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SUMMARY

This trip crosses 20 mi of forested land in the southeastern part of the Zuni Mountains. Along this route are exposures of rock that range in age from early Proterozoic to Quaternary. These rocks include granitic gneisses and aplites in the core of the range and Wolfcampian(?) Abo Formation, Leonardian Yeso, Glorieta and San Andres formations and Quaternary basalt flows from several volcanic vents in the core and along the flanks of the range. Several stops have been set up so that important stratigraphic features can be examined. If you wish to stop along the road at other places than those listed, be careful of the land ownership status. Private lands exist within and around the national forest.

Mileage

- 0.0 **Turn north on Forest Road 50** from State Highway 53 (turn off is at milepost 59; mile 112.3 of third-day road log). Road is on San Andres Formation, part of the dip slope of the south flank of the Zuni Mountains. **0.2**
- 0.2 Road crosses from limestones of San Andres Formation to sandstones in Glorieta Formation. **0.1**
- 0.3 Cross **cattleguard** onto private land. Road still on Glorieta Formation. **0.2**
- 0.5 San Andres Formation in hillside at 9:00. **0.4**
- 0.9 Road is back on San Andres Formation. **0.2**
- 1.1 Road now on Glorieta Formation. **0.4**
- 1.5 **Junction** with road to Oso Ridge Lookout (Forest Road 187). **Stay right** on Forest Road 50. Ridges at 12:00 are made up of Early Proterozoic granitic gneiss. Mount Taylor is at 2:00. **0.2**
- 1.7 Approaching switchback in road. Road crosses Glorieta-Yeso contact which is concealed beneath slope debris on hillside to the left of the road. At 12:00 note cinders from volcanic vent on Oso Ridge. Cinders rest on upper part of Yeso Formation. **0.3**
- 2.0 At 9:00, base of basalt flow from Oso Ridge rests on

- cinder deposit. Flow continues out into valley ahead (11:30–12:00). **0.2**
- 2.2 Note basalt flow from Oso Ridge at 9:00. **0.1**
- 2.3 Basalt flow at 10:00. Oak trees growing on outcrop. **0.1**
- 2.4 Ranch house at 9:00. **0.1**
- 2.5 Entrance to "No Easy Life" ranch on left. **0.1**
- 2.6 Low ridge at 2:00 is composed of Meseta Blanca Member of Yeso Formation. **0.1**
- 2.7 Oso Ridge basalt flow continues on left. **0.4**
- 3.1 Outcrop of Meseta Blanca Member lies below basalt flow on left. The Meseta Blanca Member consists of pale orange-gray to pale yellow-gray, very fine-grained, very well-sorted, subangular, friable, quartz sand. This unit typically displays low- to medium-angle crossbed sets. Up section, the beds are more tabular and locally contain halite casts. See Colpitts (this guidebook) for detailed discussion. **0.2**
- 3.3 Meseta Blanca exposed in bank of arroyo; beds dip south. This outcrop contains abundant fossil burrows. These types of burrows are also common in the upper part of the Abo Formation at Gallo Peak. **0.1**
- 3.4 Side road to left, **continue straight** ahead. **0.1**
- 3.5 Road crosses basalt flow from Oso Ridge vent. Flow conceals Abo-Yeso contact. **0.1**
- 3.6 Road to right leads to Paxton Springs; **continue straight** ahead. **0.1**
- 3.7 **Cattleguard**; entering Cibola National Forest. Basalt flow at 9:00. **0.1**
- 3.8 Basalt on Abo Formation. Abo exposed in roadcut ahead. **0.2**
- 4.0 Roadcut in Abo Formation. **0.1**
- 4.1 At 2:30, cinder cone with associated basalt flows. Goddard (1966) suggested that this cone is the source for the Zuni Canyon basalt flows that we will see later in the trip. **0.1**
- 4.2 **Cattleguard**. **0.1**

- 4.3 Road crosses old logging railroad grade. **0.1**
- 4.4 Forest Road 50 turns left toward McGaffey; **continue straight** ahead on Forest Road 49. Outcrops in roadcut immediately ahead are composed of arkosic sandstones and pebble conglomerates in the base of the Abo. This outcrop is about 30 ft above the Abo-Precambrian contact. **0.1**
- 4.5 Cross Agua Fria Creek bridge. **STOP 1.** The purpose of this stop is to examine the Precambrian-Abo unconformity. The creek runs along the contact. Park car on the north side of the bridge and climb down into the creek bed. Proceed west about 600 ft along the creek bottom to the outcrop. Outcrop displays coarse-grained, poorly sorted, feldspathic to arkosic conglomeratic, sandstones resting on deeply weathered and fractured granitic gneiss. The Precambrian-Paleozoic surface in the Zuni Mountains is uneven due to erosion by rivers and streams during Pennsylvanian(?) and Permian time. This outcrop represents a channel cut into the top of the Precambrian. Clasts in the Abo conglomerates are well-rounded to angular and are in a matrix of very coarse-grained quartz and feldspar sand. Clast types include quartz, granitic gneiss, deformed felsic volcanic rocks and red jasper. These pebbles were derived from the underlying Precambrian; no Paleozoic rock clasts have been recognized. Above the conglomerate is a monotonous sequence of red-brown mudstone which is characteristic of the Abo Formation. In the lower part of the Abo, above the basal conglomerates are scattered, isolated lenticular(?) outcrops of light gray, fossiliferous limestone. Although they are rare, these limestones do occur about 3.5 mi north of this locality near La Jara Spring, at the head of Bluewater Canyon, and near McGaffey Lake. Stop 2 will provide you with an opportunity to examine one of these limestone units. **0.1**
- 4.6 Excellent view of cinder cone north of Paxton Springs at 2:30 to 3:00. Note the well-developed vent. **Continue north** on Forest Road 49. **0.1**
- 4.7 Precambrian granitic gneiss at 9:00. This is the principal rock type found in the Precambrian at this end of the Zuni Mountains, and is exposed in roadcuts for the next 3 mi. **0.2**
- 4.9 Precambrian rocks in this area are strongly foliated and lineated. See paper by Bauer and Mawer (this guidebook) for more detailed discussion. A granite and a felsic metavolcanic rock from the Zuni Mountains yielded U-Pb zircon ages of about 1650 my (Bowring and Condie, 1982). This age is similar to those obtained from other Precambrian rocks in the Magdalena and Manzano Mountains of central New Mexico (Bowring et al., 1983). **1.0**
- 5.9 Outcrops of granitic gneiss in roadcut. **0.6**
- 6.5 Road climbs onto basalt flow. Note pressure ridge in small lobe of flow at 3:00. Main flow is east of here. This is still the flow from the cinder cone noted at miles 4.1 and 4.6. **0.1**
- 6.6 Dirt track to left; **stay right** on main road. **0.2**
- 6.8 Note basalt flow at 2:00. Road follows flow for about a mile. Also note old logging railroad grade between road and flow. Granitic gneiss boulder on left shows a sharp contact between fine-grained aplitic rock and granitic gneiss. The fine-grained rock is the gneissic aplitic mapped by Goddard (1966). **0.2**
- 7.0 Outcrops of granitic gneiss to left of road. **0.2**
- 7.2 Basalt flow at 3:00 extends northeastward toward the head of Zuni Canyon. This is part of the Zuni Canyon flow which we will see in Zuni Canyon. **0.2**
- 7.4 Elevation 7738 ft on topographic map of area; hill at 10:30 to 11:00 is granitic gneiss. Outcrops to right are the same. **0.5**
- 7.9 Road still on granitic gneiss. Approaching Abo-Precambrian contact. Ridge in middle distance at 12:00 is composed of interbedded grayish-red to red-brown sandstones and dark reddish-brown mudstones of the Abo Formation. Ridge in the far distance is capped by limestone, sandstone and dolomite of the San Andres Formation. The San Andres is underlain by white to light gray, well-sorted sandstones of the Glorieta Formation. Beneath the Glorieta are pale reddish-brown and reddish-gray sandstones and olive-gray to very dark-gray limestones and dolomitic limestones of the Yeso Formation. The head of Zuni Canyon is visible through the trees at 1:30. Road ahead runs approximately along the Abo-Precambrian contact. **0.1**
- 8.0 Ridge to left of road displays outcrops of a limestone bed in the lowest part of the Abo Formation. **STOP 2.** The purpose of this stop is to examine one of the limestones in the lowest part of the Abo Formation. No age assignments have been made for these units in this part of New Mexico; diagnostic fusulinids or conodonts have not yet been discovered in these beds. Fossils at this locality include bryozoans, gastropods, brachiopods and shell debris. These beds are locally arenaceous, with fine to coarse grains of quartz and pink feldspar. Locally, pebbles from the underlying Precambrian may be found within this limestone. Pebbles are well-rounded, whereas sand grains are angular. The limestone bed is discontinuous along strike but extends down-dip to the northwest. The limestone bed is surrounded by dark reddish-brown mudstones and brown to grayish-red pebble conglomerates of the lower Abo. Due to the presence of high-angle faults to the north and west, the entire outcrop is surrounded by Precambrian granitic gneiss and porphyritic granite (Goddard, 1966). Although the age of these carbonates is not known, they possibly represent Pennsylvanian marine deposits (Smith et al., 1957). **0.2**
- 8.2 Cross **cattleguard** onto private land. Limestone unit in base of Abo Formation on left side of road has pinched out; arkosic to feldspathic sandstone and conglomerate with dark reddish-brown mudstone is now abundant. **0.3**
- 8.5 Cross **cattleguard**. Fault contact between Abo and Precambrian at 11:00. Faulting between the Abo and Precambrian farther west appears as a high-angle, reverse fault on Goddard's (1966) map. **0.2**
- 8.7 Cross **bridge**. Abo in ridge in middle distance. High ridge shows (in descending order) outcrops of San Andres, Glorieta and Yeso formations. This latter sequence is separated from Abo strata in the middle ridge by a high-angle fault. **0.6**
- 9.3 Note basalt flows at head of Zuni Canyon at 2:00 to 2:30. **0.2**
- 9.5 Abo at 9:00. Sandstones represent fluvial deposits; mud-

- stones represent overbank muds deposited across a coastal plain or the distal portion of an alluvial fan (Little, 1987). **0.2**
- 9.7 Road climbs out of valley. Note sandstones and mudstones of Abo Formation in roadcut. **0.1**
- 9.8 Road to left is Forest Road 480. **Continue straight** ahead on Forest Road 49. Basalt flow at 12:00 is an older flow from a vent near Cerro Colorado north of here. Bold cliffs in background are capped by olive-gray San Andres Formation and are underlain by very light-gray to white Glorieta Formation and red Yeso Formation. Notice the three gray layers that occur between $\frac{1}{3}$ and $\frac{1}{2}$ way up the cliff. These are the three carbonate marker beds that are characteristic of the upper Yeso Formation in this area. See paper by Colpitts (this guidebook) for a discussion of Yeso strata in the Zuni Mountains. **0.2**
- 10.0 These steeply dipping ($70\text{--}75^\circ$) strata of the Abo Formation occur adjacent to a fault which separates Abo from Yeso. This high-angle, anastomosing fault, which displays variable stratigraphic throw along strike, extends from near Bluewater Canyon to the northwest into Bonita Canyon to the south. **0.2**
- 10.2 End of older basalt flow from north at 9:00. **0.1**
- 10.3 **STOP 3.** The purpose of this stop is to examine the upper part of the Yeso Formation and the three carbonate marker beds that characterize this interval. Although these carbonates are associated with evaporites (primarily gypsum,) about 4 mi southeast of this point, the evaporites are absent here. See Colpitts' paper (this guidebook) for a discussion of lateral relationships among these carbonate units. The Glorieta and San Andres formations are also accessible at this location. Be very careful climbing the slope; many of the large rocks are unstable. Note the Zuni Canyon basalt flow from 12:00 to 3:00. **0.4**
- 10.7 **Junction** with Forest Road 447 to right. **Continue straight** ahead down Zuni Canyon toward Grants. **0.3**
- 11.0 The three carbonates in the upper part of the Yeso are exposed in the cliff face at 9:00. These beds are also on the right side of the road, though they are not as well exposed. The lowest carbonate is nearly at road level here. **0.3**
- 11.3 Old log slide at 3:00. Logs cut on top of the mesa were run down the slide by cable and used as ties in railroad construction. **0.6**
- 11.9 Note Glorieta-Yeso contact in cliff at 9:00. The Glorieta contact is drawn at the top of the highest red bed in the Yeso Formation. The Glorieta is overlain by a San Andres carbonate bed. Immediately above this carbonate bed is a tongue of the Glorieta. This sandstone body is locally referred to as "the middle sandstone of the San Andres."
- Above this sandstone is more San Andres carbonate. The top of the San Andres is marked by an erosional unconformity. This eroded surface is also characterized by extensive karst. Above this unconformity are Triassic strata belonging to the Chinle and Moenkopi(?) formations (Maxwell, 1986). Also note old log slide at 3:00. **0.2**
- 12.1 Remnants of Zuni Canyon basalt flow on either side of the road. **0.3**
- 12.4 Carbonate bed in hillside at 9:00 is uppermost Yeso carbonate. We are going up section as we go down canyon toward Grants. **0.3**
- 12.7 **OPTIONAL STOP.** This stop is designed for those who wish to see one of the Yeso carbonates but wish to have a less strenuous climb than at Stop 3. Although the climb is not difficult, sturdy shoes are essential. The carbonate bed is located at 9:00 to 10:00 in the hillside. This is also a good place to look at the Glorieta and San Andres formations, and spectacular vistas await those who reach the top of the mesa. **1.2**
- 13.9 Upper carbonate of Yeso in side of hill at 9:00. We are crossing a broad anticlinal flexure. **0.3**
- 14.2 Cattleguard. **0.3**
- 14.5 Note red beds of Yeso Formation above us at 3:00; at 10:00, three-quarters of the way up the slope, is the Glorieta-San Andres contact. Zuni Canyon basalt flow in outcrop at 9:00. **0.3**
- 14.8 Note contact of Yeso and Glorieta formations at 9:00 about halfway up the slope. **0.4**
- 15.2 Remnant of Zuni Canyon flow in roadcut to left. **1.0**
- 16.2 Note old logging railroad right-of-way at 3:00. **0.2**
- 16.4 **Cattleguard;** leaving Cibola National Forest. **0.3**
- 16.7 Note Glorieta Formation on left. **0.5**
- 17.2 Note that basalt flow fills floor of canyon. **0.6**
- 17.8 At 3:00, note crossbedded middle sandstone member of the San Andres Formation. **0.2**
- 18.0 Zuni Canyon is bounded here by cliffs of San Andres Formation. **0.2**
- 18.2 San Andres-Glorieta contact is in canyon walls to right and left. **0.2**
- 18.4 Mount Taylor is at 12:00 with Grants Mesa to left and Horace Mesa to right. **0.5**
- 18.9 **Cattleguard.** Beginning of paved road. **0.1**
- 19.0 Note cliffs of San Andres Formation to right; old quarry on left. **0.4**
- 19.4 **Intersection; continue straight** ahead. **1.3**
- 20.7 **Sharp right turn;** Zuni Canyon Trading Post on left. **0.1**
- 20.8 **Sharp left turn;** rejoin State Highway 53. **Turn left** toward Grants. **0.2**
- 21.0 **Junction** with eastbound entrance to Interstate 40.

End of Supplemental Road Log 4.