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Geology of the Fort Leonard Wood Military Reservation and adjacent areas, south-central Missouri

by

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with contributions on Quaternary terraces by

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Introduction

This report presents results of geologic mapping of the Fort Leonard Wood Military Reservation (FLWMR)and surrounding area in south-central Missouri by geologists of the Geologic Division, U.S. Geological Survey (USGS). This work was done in support of geohydrologic and water-quality investigations of the FLWMR conducted by the USGS Water Resources Division. The main emphasis of the study was to map and characterize bedrock fractures, faults, and geologic contacts, as well as add to the inventory of karst structures, caves, springs, and other features of geohydrologic concern. Plate 1 is the geologic map produced during this study.

Field work occurred from November, 1994 through May, 1995. Work procedures involved traversing as many drainages and roads as possible during the period in search outcrops, mapping the bedrock exposures found, and describing the geologic characteristics of bedrock and surficial sites throughout the area. Plate 2 shows the location of bedrock outcrops observed in the area as well as sites of numbered control point entries. Field notes for each control point are given in appendix A. In most cases, data entered for each outcrop represent a summary of information derived from the entire outcrop. The mapped area covers approximately 175 square miles in parts of the Waynesville, Devils Elbow, Brownfield, Big Piney, Winnipeg, and Robey 7.5-minute quadrangles and all of the Bloodland 7.5-minute quadrangle. A total of 2,508 field data control points and data from 116 drill holes archived in the files of the Missouri Department of Natural Resources, Division of Geology and Land Survey, Rolla, Missouri (appendix B) were incorporated into the geologic map. Geologic contacts along the eastern side of Plate 1 in areas that were not inspected during this field work were adapted from Middendorf (1984) and Sumner and Easson (1986).

Surficial Deposits

Greater than 95 percent of the mapped area consists of surficial deposits of residuum, loess, colluvium, and alluvium. Residuum (not mapped) consists of silty and sandy loam to very cherty silty loam derived from *in situ* weathered bedrock in the upland areas and is probably Tertiary in age (Bretz, 1965). Loess deposits (designated with a Ql symbol on geologic map where observed) consist of wind-blown silty loam and probably correlate with the Loveland Silt (Illinoian Stage) and Peoria Loess (Wisconsinan Stage)(Guccione, 1991). Colluvial material (not mapped) derived from mass wasting of residuum and loess occurs on most steep slopes in the area. Recent alluvial fill and older terrace deposits (Qal and Qt, respectively) occur on the flood plain of the major drainages and tributaries. Many of the terrace deposits within the FLWMR boundaries were initially mapped by Albertson and others (1995) at 1:12,000 scale and were subsequently incorporated into the geologic map (Plate 1). More detailed descriptions and maps of surficial deposits can be found in Long and others (1912), Watkins and others (1919), Wolf (1989), Whitfield (1986), and Albertson and others (1995).

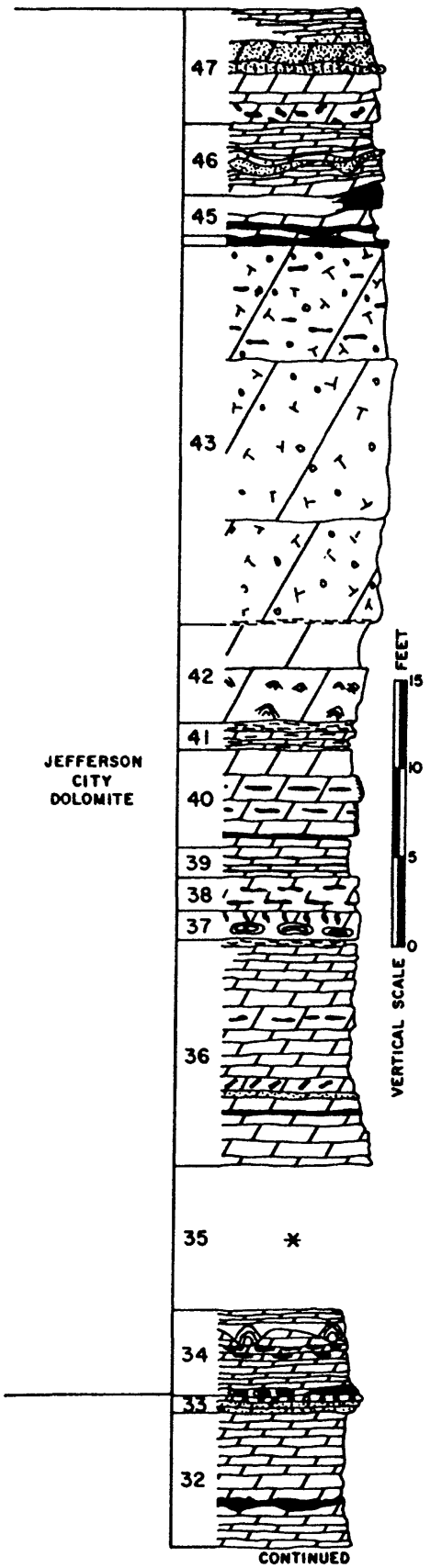
Bedrock Stratigraphy

Outcropping bedrock stratigraphy in the FLWMR area consists of three Lower Ordovician units, from the base upward: Gasconade Dolomite, Roubidoux Formation, and Jefferson City Dolomite. A stratigraphic section measured in the northern part of the mapped area from Thompson (1991; adapted from Beveridge and Aughenbaugh, 1972) provides an almost complete sequence for the region (Fig. 1). Depositional environments for all three formations are interpreted as shallow-water platform marine, intertidal, and supratidal settings.

Gasconade Dolomite

Gasconade Dolomite (Nason, 1892) is the oldest exposed formation in the FLWMR area. It crops out at lower elevations along the banks of Big Piney River and Roubidoux Creek, and several of their tributaries. Maximum exposed thickness is approximately 180 ft; drill data indicates an average thickness of about 310 ft throughout the area, with a range from about 270 to 355 ft.

Figure 1. Section of Gasconade Dolomite, Roubidoux Formation, and Jefferson City Dolomite exposed in roadcut along I-44 west of Saint Robert interchange, sec. 30, T. 36 N., R. 11 W., Waynesville 7.5-minute quadrangle, Pulaski County, Missouri (from Thompson, 1991).



ORDOVICIAN SYSTEM

Jefferson City Dolomite (75 ft)

Units 36-47 measured on north side of west-bound onramp.

47. Dolomite, cotton rock, sandy at top; irregular chert blebs in dolomite layer at base; siliceous sandstone near middle; to top of hill. (6.2 ft)
46. Dolomite, buff, medium-grained, medium-bedded at base, thin-bedded above channel; layer of siliceous sandstone in trough of channel. (3.2 ft)
45. Dolomite, buff, and chert, dark-gray with brown areas. (3.2 ft)
44. Chert, blue-gray, round and angular chert fragments in a siliceous oolite matrix. This chert layer intersects upper one-third west-bound onramp road. (0.3-0.6 ft)
43. Dolomite, smoky-gray, fine-grained, thick to massive-bedded, fucoidal, pitted, with quartz and/or calcite lining; fetid odor produced on crushing; upper unit has flat, white chert nodules and some blue-gray and white banded chert nodules ("Quarry ledge"). (20.7 ft)
42. Dolomite, gray, medium-grained, pitted, weathered surface shows light-brown areas, cryptalgal structure at base, has some features of "Quarry ledge." (5.4 ft)
41. Dolomite, blue-gray; shale at top; pinches out uphill; recessive. (1.2-1.7 ft)
40. Dolomite, gray, medium-grained, laminated; contains bands of chert and chert breccia. (5.4 ft)
39. Dolomite, as above, but with bands of chert. (1.6 ft)
38. Dolomite, blue-gray, weathers smoky-gray; pits with quartz druse and spar lining ("lower Quarry ledge"). (1.9 ft)
37. Dolomite, buff, medium-grained, local bulls-eye chert which has alternating bands of chert and dolomite; fragments of blue-gray chert at top. (1.5 ft)
36. Dolomite, light-gray, weathers smoky-gray, medium-grained; irregular areas of coarse-grained dolomite; uniform medium-bedding; 5% blue-gray and white chert layers; one layer of chert breccia; one sandy layer; green shale at top. (12.3 ft)
35. Covered, at green Saint Robert turnoff sign. (8 ft)

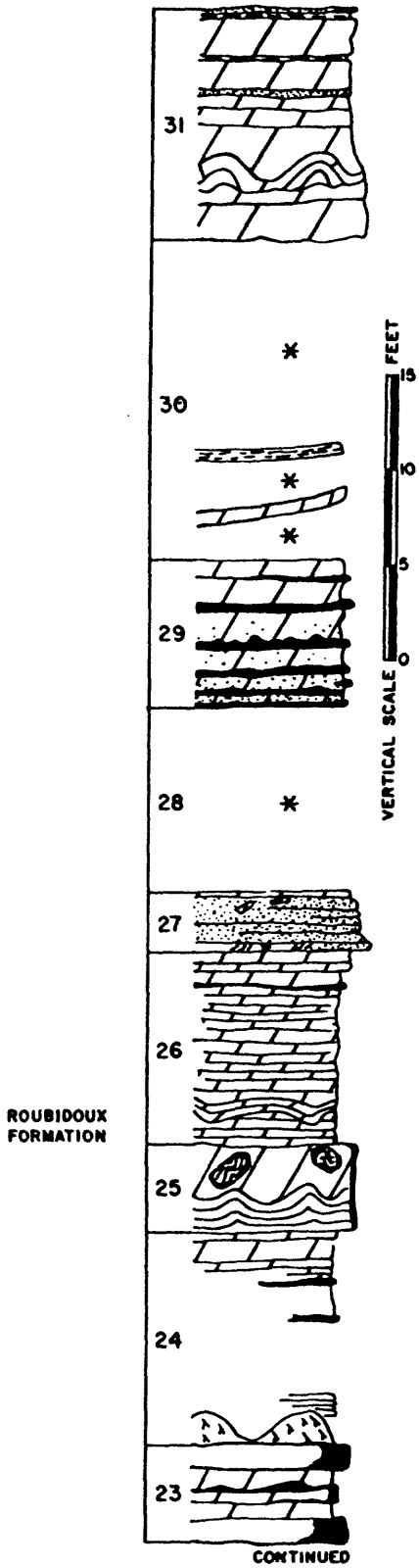
Units 30-34 measured from roadcut southeast of St. Roberts turnoff sign.

34. Dolomite, buff-weathering, lower third breaks down to shaly material; white-weathering chert in upper part and distinctively banded chert at base; cryptalgalaminated horizon at top. (1.0-1.6 ft)

Roubidoux Formation (133 ft)

33. Dolomite, light-gray, medium-grained, sandy; 0.3 ft siliceous oolite layer at top; scattered gray flat chert nodules. (1 ft)
32. Dolomite, gray, weathers tan (distinct from below) medium- to thin-bedded; fractured tripolitic chert layers in lower part ("Buhrstone horizon"). (7.4 ft)

Figure 1.

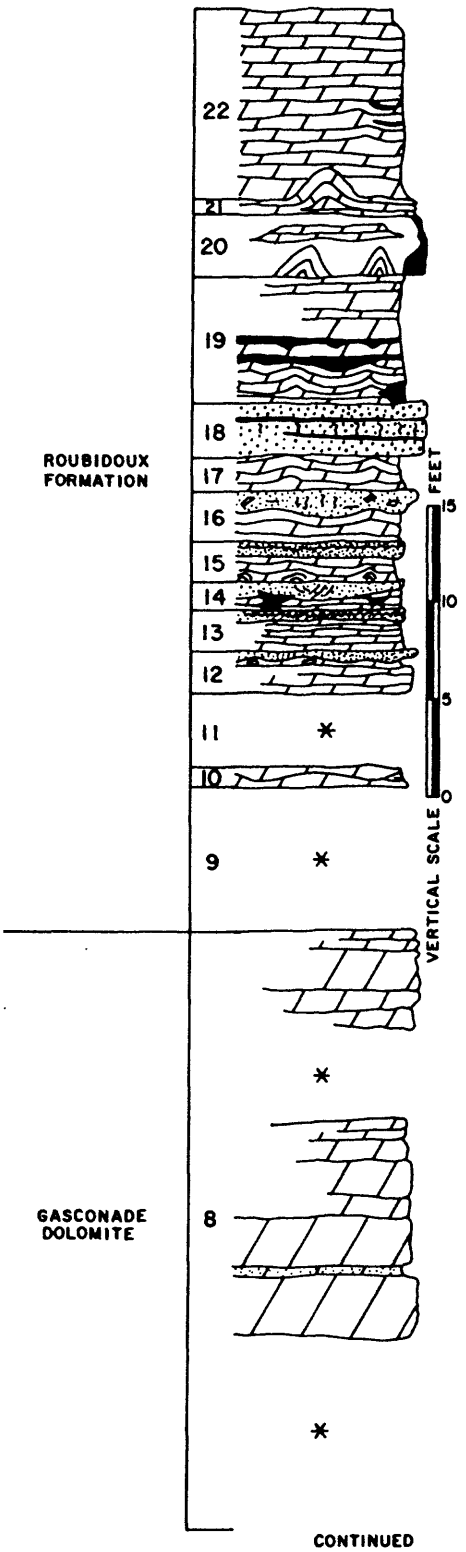


31. Dolomite, light-gray, weathers smoky-gray, medium-grained, thick- to thin-bedded; scattered spar-filled vugs, two green shale layers; one siliceous sandstone bed; cryptalgal structure in lower part. (12.1 ft)
30. Covered; in ravine across from "DeVille Motor Inn" sign. (16.5 ft)
29. Dolomite, light-gray, sandy toward base, alternating with chert layers and nodules, some being tripolitic; exposed only in ditch across highway from caution sign on west-bound lane. (7.5 ft)
28. Covered ravine. (11 ft)

Units 10-27 exposed in cut and ravine across highway and west from caution sign on west-bound lane.

27. Sandstone, brick-red below and white upper 1.7 ft; ripple-marked and mud-cracked; some red sandstone is quartzitic and cross-bedded; upper part contains doloclasts. (3.2 ft)
26. Dolomite, dull-brown with greenish-brown partings, thin-bedded; blue-gray or tripolitic chert nodules; top 1 ft medium bedded, harder. (9.9 ft)
25. Dolomite, siliceous in many places; cryptalgal structures. (4-4.5 ft)
24. Dolomite, thin-bedded, with blue-gray chert layers; 40-50% chert; not readily accessible; basal 3 ft coarse-grained, brown weathered dolomite with cryptalgal structures. (11 ft)
23. Chert, banded blue-gray with white surface, interbedded with brown, thin-bedded dolomite. (5.3 ft)

Figure 1 (cont.).



22. Dolomite, thin-bedded, beds locally siliceous; upper 1.5 ft darker, recessive. (9.5 ft)
21. Dolomite, cryptalgal; beds 20 and 21 form algal zone. (0.5-2.3 ft)
20. Chert, contains cryptalgal structures, locally grades into dolomite. (3 ft)
19. Dolomite, light-gray and buff, coarsely crystalline, thin- to medium-bedded; local chert layers; base locally siliceous or algal. (6.2 ft)
18. Quartzite, oolitic, light-gray to white, with thin, white chert layers. (2.8 ft)
17-12. Dolomite, tan and gray mottled, thin-bedded; contains white tripolitic chert masses; stromatolitic; alternating with thinner siliceous and ripple-marked sandstone. (11.7 ft).

Units 9-11 measured in drainage ditch at Saint Robert city limits sign.

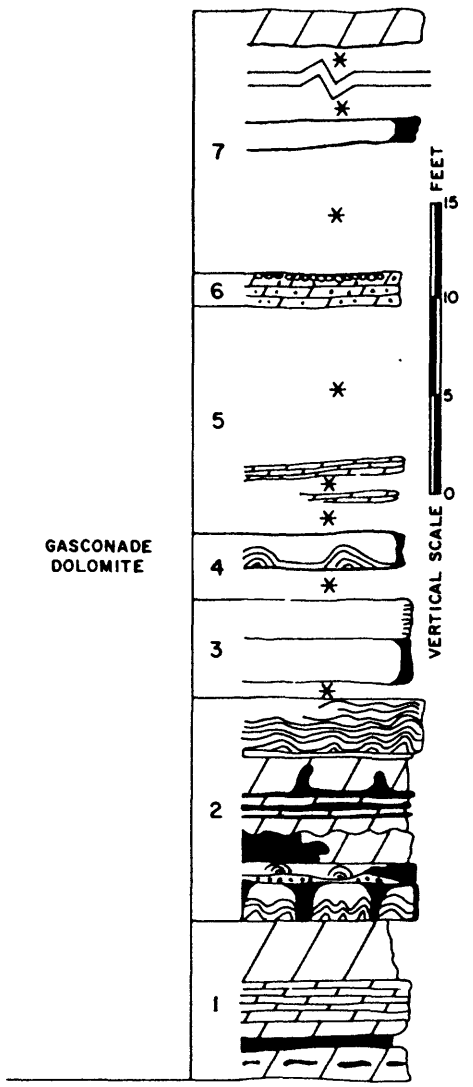
11. Covered. (3.8 ft)
10. Dolomite, light-buff and gray, medium-grained; top knobby and mud-cracked; contains small white tripolitic chert masses.
9. Covered. (7.4 ft)

Units 4-8 along south edge of east-bound lane

Gasconade Dolomite (116 ft)

8. Several discontinuous exposures of dolomite, buff, coarsely crystalline, like top of unit 7 below; non-cherty "upper Gasconade Dolomite"; measured along the north side of the east-bound lane of I-44. (30.5 ft)

Figure 1 (cont.).



7. Dolomite, buff, coarsely crystalline; sand-sized grains upper 2-3 ft of unit; and dolomite, siliceous, quartz-lined cavities; planispiral gastropods; 1-2 ft bed 10 ft above base; measured along north edge of east-bound lane; most of interval covered. (44.5 ft)
6. Dolomite, light-brown; 2-3 in. siliceous oolite bed at top; beds form a ledge in talus. (1.7 ft)
5. Mainly covered interval; several thin-bedded dolomite beds exposed in lower 5 ft. (11.5 ft)
4. Chert, gray and white banded, with dolomite mounds; in flat area between lanes. (3.5 ft)

Units 1-3 exposed on north side of west-bound lane of I-44 just east of bridge over Roubidoux Creek.

3. Chert, gray and white banded; bands flatter than those in unit 2. (5 ft)
2. Dolomite, tan, medium-grained, beds laterally replaced by chert; cryptalgalaminate beds at top and bottom. (11.2 ft)
1. Dolomite, lower ledge gray, upper ledge tan. (8 ft)

Figure 1 (cont.).

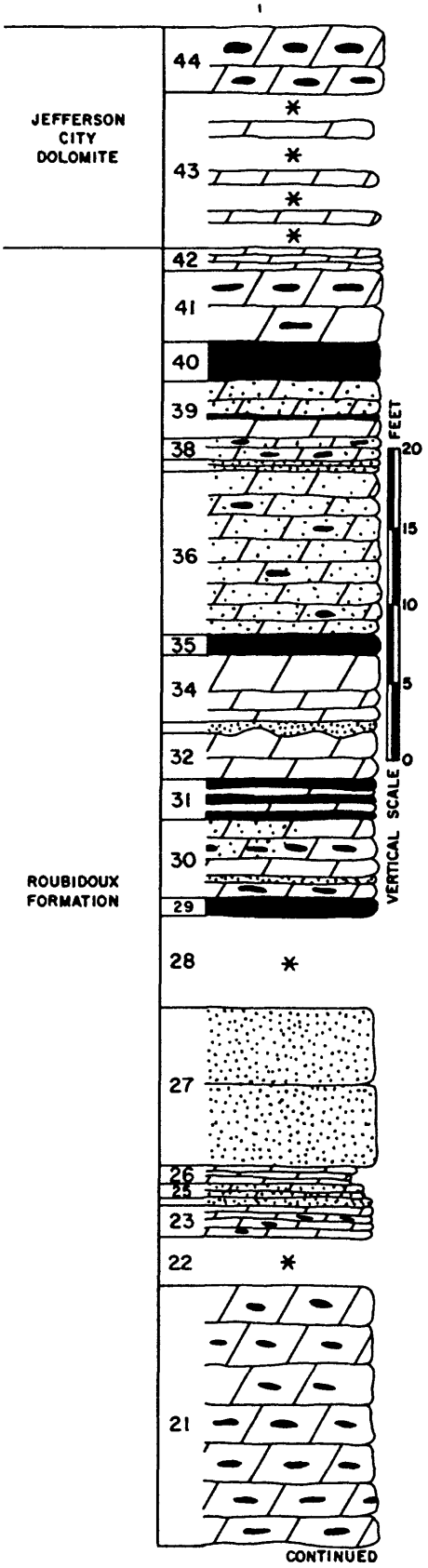
Exposures of this formation in the FLWMR area consist of dolomite and chert. Based on the amount of chert, bedding characteristics, and in part on grain size, the unit is divisible into upper and lower parts. The lower part of the Gasconade contains moderate to abundant chert nodules and lenses, and is medium to thin bedded and medium to fine grained. Most chert is a white, porcelaneous variety or a type that has a "dry bone" or "dead" appearance. A persistent stromatolitic chert horizon, generally 10-15 ft thick and from 30 to 50 ft below the top of the formation, separates upper and lower Gasconade throughout the FLWMR area. The upper part of the Gasconade is nearly chert free, massive to thick bedded, and medium to coarse grained. Intraformational breccia horizons, as much as 4 ft thick, are common in the upper Gasconade and are commonly the sites of water seepage.

The Gasconade Dolomite is sparsely fossiliferous. Rare planispiral gastropods and cephalopods were observed in chert in the lower part of the Gasconade. A sample was collected for conodont analysis from the upper part of the Gasconade exposed in a bluff along the east bank of Roubidoux Creek, approximately 1.83 mi upstream from Waynesville, Missouri (SW1/4NW1/4NE1/4 sec. 31, T. 36 N., R. 11 W., Waynesville 7.5-minute quadrangle). Analysis by John E. Repetski (USGS, Reston, Virginia) determined an early Early Ordovician age (Ibexian), *Rossodus manitouensis* Zone, and a Conodont Color Alteration Index of 1 to 1+ was assigned, indicating minimum post-burial heating in the range of 50° to 90° C. Assuming a normal geothermal gradient (40° C/mi), this suggests a maximum burial depth of 1.2-2.4 miles. The sample contained a shallow water species association typical of the Gasconade Dolomite. In addition, preliminary analysis by Repetski of Gasconade samples collected from type section of the Roubidoux Formation (Fig. 2) by Dr. James D. Loch (Central Missouri State University) indicates that the uppermost Gasconade Dolomite in south-central Missouri extends upward, from the *Rossodus manitouensis* Zone, into the "Low Diversity Interval" of Ross and others (1993) (= earliest medial Ibexian; = lowest part of Fauna D of Ethington and Clark, 1971), as postulated by Repetski and others (1993).

Roubidoux Formation

The Roubidoux Formation (Nason, 1892) occurs extensively throughout the mapped area, particularly in the northern uplands

Figure 2. Type section of Roubidoux Formation, SE1/4, NW1/4, SW1/4 sec. 10, T. 33 N., R. 12 W., Texas County, Missouri (from Thompson, 1991; adapted from Heller, 1954).



ORDOVICIAN SYSTEM

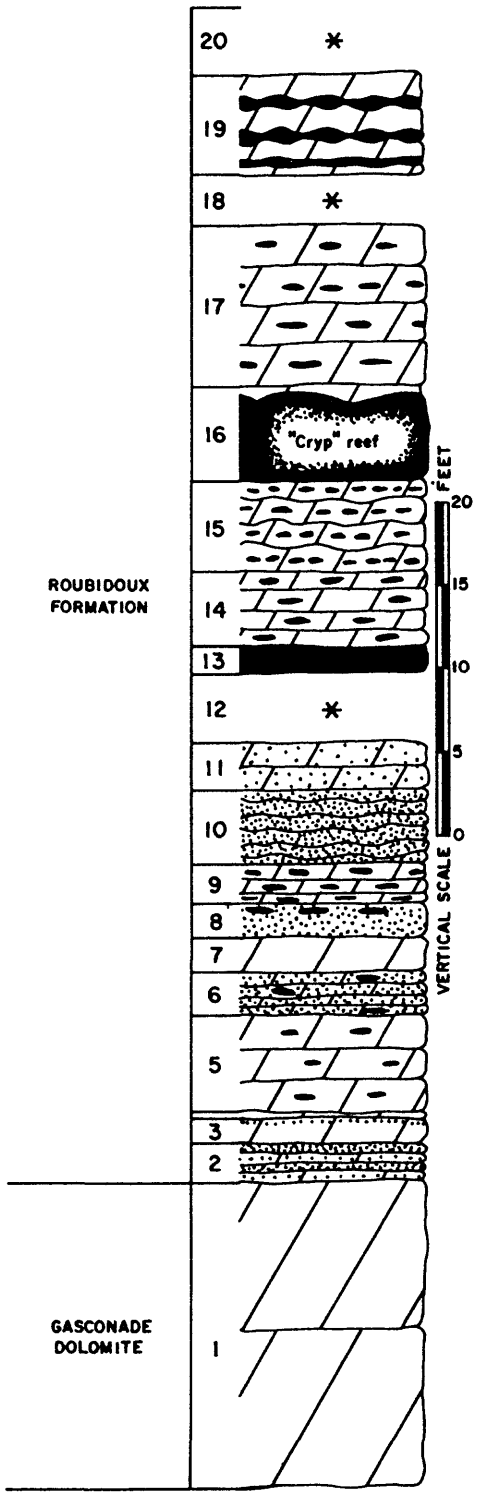
Jefferson City Dolomite

44. Dolomite, light-brownish-gray, fine-grained, vuggy, massively bedded; contains abundant large rounded nodules of light- to medium-gray, banded, porcelaneous, non-sandy chert. (3 ft 8 in.)
43. Covered interval; numerous poor exposures of very fine-grained, argillaceous, tan dolomite ("cotton rock"). (9 ft 8 in.)

Roubidoux Formation

42. Dolomite, light-brownish-gray, fine-grained, very sandy; and sandstone, light-brownish-gray, fine-grained, dolomitic; thin-bedded; contains small amount of light-gray, sandy, oolitic chert. (1 ft)
41. Dolomite, light-brownish-gray, fine-grained, vuggy, massively bedded; contains moderate amount of irregular nodules of light- to medium-gray, porcelaneous to sandy chert. (5 ft.)
40. Chert, light- to medium-gray, quartzose to sandy and oolitic, massively bedded. (2 ft 6 in.)
39. Dolomite, light-brownish-gray to cream, fine- to very-fine-grained, pure to sandy, medium-bedded; occasional thin beds of light-gray to medium-brownish-gray, often sand-centered, oolitic chert. (3 ft 4 in.)
38. Dolomite, light-brownish-gray, fine-grained, slightly sandy; abundant light- to dark-gray irregular nodules and masses of quartzose to drusy and sandy, partly algal, oolitic chert. (1 ft)
37. Sandstone, light-gray, fine-grained, quartzitic, thin-bedded. (4-8 in.)
36. Dolomite, light-brownish-gray, fine-grained, sandy, medium-bedded; occasional irregular nodules and angular fragments of light- to dark-gray, oolitic chert. (10 ft 8 in.)
35. Chert, light-gray to medium-dark-gray, oolitic and sandy to sub-chalcedonic (some oolites have sand-centers). (1 ft 0-6 in.)
34 Dolomite, light-gray, fine- to coarse-grained, vuggy, massively bedded. (3 ft 10 in.)
33. Sandstone, light-gray, fine-grained, quartzitic; conglomerate near top; some medium-gray porcelaneous chert. (6-10 in.)
32. Dolomite, light-brownish-gray, fine- to medium-grained, vuggy, massively bedded. (2 ft 6 in - 3 ft.)
31. Chert, light-gray to medium-brownish-gray, banded; porcelaneous to quartzose to sandy and oolitic; bedding irregular; some interbedded light-brownish-gray, fine- to medium-grained dolomite. (2 ft 6 in.)
30. Dolomite, light-brownish-gray, very fine-grained, locally sandy, medium-bedded; occasional thin beds and nodules of light- to medium-gray, porcelaneous to sandy chert; thin lenses of fine-grained sandstone. (5 ft)
29. Chert, light- to medium-gray, sandy, oolitic, medium-bedded. (1 ft 2 in.)
28. Covered interval. (5 ft 8 in.)
27. Sandstone, light-gray, fine-grained, massively bedded; a few thin quartzitic sandstone lenses. (8-12 ft)
26. Dolomite, light-gray to steel-gray, fine- to medium-grained, thin-bedded (0.25-1 in.); forms reentrant under massive sandstone. (1 ft 2 in.)
25. Dolomite, light-brownish-gray to medium-gray, fine-grained, very sandy, thin-bedded. (8 in.)
24. Sandstone, light-gray, fine-grained, medium-bedded. (8 in.)
23. Dolomite, light-brownish-gray to steel-gray, fine-grained, thin-bedded; some white porcelaneous chert. (2 ft)
22. Covered interval. (2 ft 9 in.)
21. Dolomite, light-brownish-gray, medium-grained, massive beds; abundant irregular masses of light- to medium-gray porcelaneous chert. (16 ft 1 in.)

Figure 2.



20. Covered interval. (4 ft 4 in.)
19. Dolomite, light-brown to tan, fine- to medium-grained, slightly sandy, irregularly bedded; light- to medium-gray porcelaneous to sandy and oolitic chert. (5 ft 8 in.)
18. Covered interval. (2 ft 8 in.)
17. Dolomite, light-brownish-gray, fine- to medium-grained, vuggy, massively bedded; abundant small nodules of light-gray to medium-dark-brown porcelaneous sandy chert. (9 ft 8 in.)
16. Chert, light- to medium-dark-gray, porcelaneous to subchalcedonic, irregularly banded; some poorly developed algal structures; some inclusions of light-brown fine-grained dolomite. (5 ft 8 in.)
15. Dolomite, light-gray to tan, medium-grained, irregularly bedded; irregular lenses, stringers, and angular fragments of white to light-gray porcelaneous chert scattered throughout the dolomite. (5 ft)
14. Dolomite, light-brownish-gray, fine-grained, vuggy, medium-bedded; abundant small, botryoidal masses of light-gray subchalcedonic chert and large nodules of dead-white porcelaneous chert. (4 ft 9 in.)
13. Chert matrix sand, light-gray, fine-grained; matrix light gray porcelaneous chert; thin to medium-bedded. (1 ft 4 in.)
12. Covered interval. (3 ft 10 in.)
11. Dolomite, light-brownish-gray, fine-grained, sandy to very sandy, massively bedded; weathers to dirty gray. (2 ft 9 in.)
10. Sandstone, light-gray, fine-grained, locally quartzitic irregular beds. (4 ft 10 in.)
9. Dolomite, light-brownish-gray, fine-grained, medium bedded; abundant smooth white-weathering chert. (2 ft 4 in.)
8. Sandstone, light-brown, fine-grained, massively bedded; occasional lenses of very sandy oolitic medium-gray chert breccia in top of unit. (2 ft 1 in.)
7. Dolomite, light-brownish-gray, fine- to medium-grained, vuggy; weathers to pitted surface. (2 ft 1 in.)
6. Sandstone, light-brownish-gray, fine-grained, dolomitic, locally quartzitic, thin-bedded; grades locally into sandy dolomite; abundant thin lenses and nodules of light- to medium-gray porcelaneous to sandy chert. (2 ft 6 in.)
5. Dolomite, light-brown, fine- to medium-grained, slightly vuggy, medium to massively bedded; small nodules of light- to dark-gray porcelaneous chert. (6 ft)
4. Dolomite, light-brownish-gray, fine-grained, argillaceous, thin-bedded. (3 in.)
3. Dolomite, light-brownish-gray, fine- to medium-grained, massively bedded; thin bed of dolomitic sandstone at top. (2 ft)
2. Sandstone, light-brownish-gray, fine-grained, rounded and frosted, well-cemented, dolomitic; dolomite, light-brownish-gray, fine-grained, very sandy; thin- to medium-bedded. (2 ft 4 in.)

Gasconade Dolomite

1. Dolomite, light-brownish-gray to light-gray, fine- to coarse-grained, massively bedded, non-cherty. (18 ft 4 in.)

Figure 2 (cont.).

and along the banks of Roubidoux Creek in the southwest portion of the map. Its thickness ranges from 90 to 160 ft, but typically is about 140 ft. Type section for the Roubidoux Formation, as proposed by Thompson (1991), is along the west bank of Roubidoux Creek in the southwest corner of the geologic map in SE1/4, NW1/4, SW1/4 sec. 10., T. 33 N., R. 12 W., Robey 7.5-minute quadrangle (Fig. 2). Its contact with the underlying Gasconade Dolomite is typically sharp and well defined, and is placed above the highest thick-bedded to massive dolomite assigned to the Gasconade and below the lowest sandstone or sandy dolomite bed of the Roubidoux.

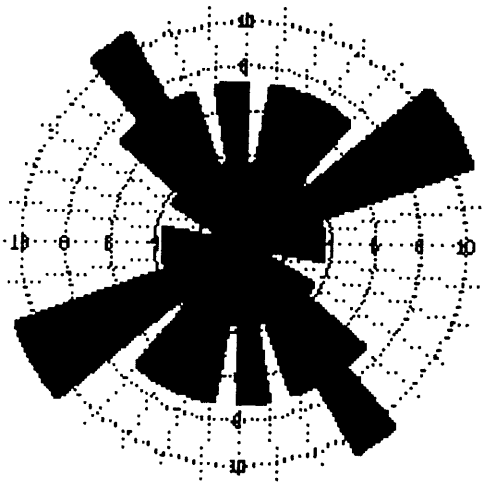
In the FLWMR area, Roubidoux Formation consists of quartz sandstone, sandy to pure dolomite, and chert. In the two measured sections described by Thompson (1991) (Figs. 1 and 2), sandstone comprises only 10-15 percent of the Roubidoux, with most of the formation consisting of dolomite. However, of the 686 Roubidoux outcrops located during our mapping, approximately 79 percent were sandstone. This discrepancy reflects a more resistant weathering characteristic of the sandstone beds, an anomalously sandstone-rich area, or a combination of both.

Desiccation cracks, trough cross bedding, both symmetrical and asymmetrical ripple marks, and flow casts are very common in Roubidoux sandstone. Flow directions determined from Roubidoux ripple marks show a highly variable pattern (Fig. 3). All of these features suggest intertidal and supratidal depositional environments subject to periodic subaerial exposure.

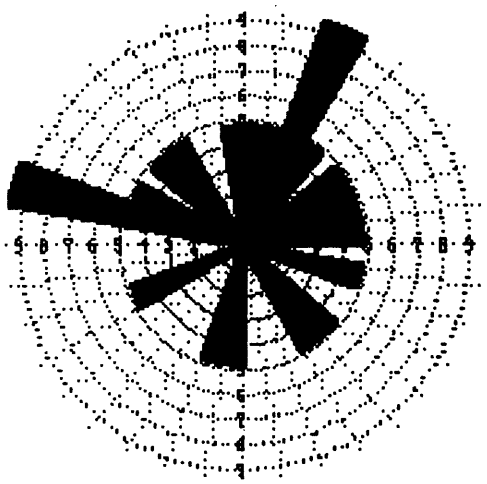
Sandstone is fine to coarse grained, poorly sorted, and grains are subrounded. Beds are of medium thickness to massive and commonly contain lenses of orthoquartzite and thin layers of angular, white chert granules. Primary cements are macrocrystalline quartz overgrowths in sandstones and microcrystalline quartz in orthoquartzites, both presumedly replacing carbonate material (Carver, 1961). Dolomite is light gray to tan, fine to medium grained, thin to thick bedded, and commonly sandy and/or cherty, although pure varieties, void of sandstone and chert, also occur. Chert is light to dark gray, nodular to irregularly bedded, and consists of banded, oolitic, and porcelaneous varieties. Bedded chert intervals are generally either stromatolitic or brecciated.

Roubidoux Formation is sparsely fossiliferous, but no fossils were observed in our investigation. However, Heller (1954) reports the sparse occurrence of brachiopods, cephalopods, and trilobites in this formation. John E. Repetski (USGS, Reston) has done a preliminary examination of conodonts collected from a reconnaissance sampling of the type section of the Roubidoux

Figure 3. a) Compass-rose diagram of symmetrical ripple marks measured in sandstone deposits of the Roubidoux Formation showing bidirectional crest lines; b) Compass-rose diagram of asymmetrical ripple marks measured in sandstone deposits of the Roubidoux Formation showing direction of current flow.



a)



b)

Figure 3.

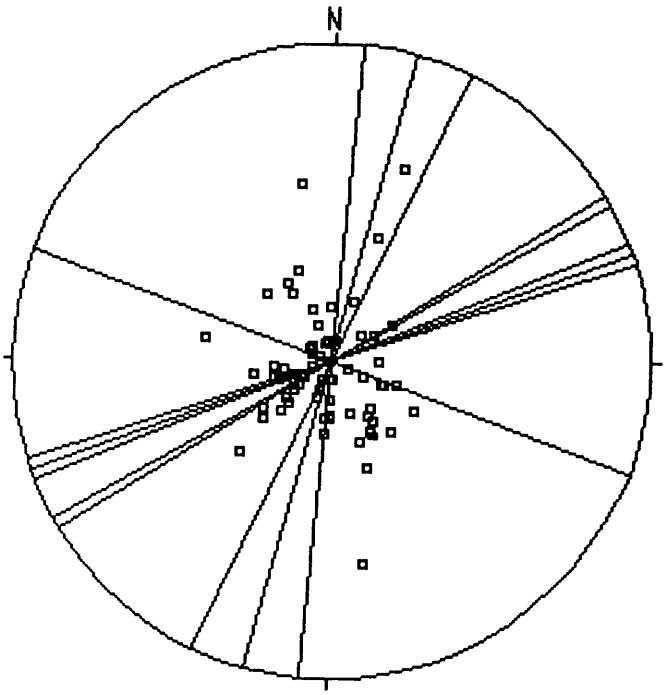
Formation (Fig. 2) by Dr. James D. Loch (Central Missouri State University). These samples contain taxa typical of warm, shallow marine conditions of the North American Midcontinent Faunal Realm. Repetski's preliminary analysis indicates that at this location the Roubidoux Formation ranges from within the "Low Diversity Interval" of Ross and others (1993) (= earliest medial Ibexian; = lowest part of Fauna D of Ethington and Clark, 1971) through some part of the succeeding *Macerodus dianae* conodont Zone; and that the Roubidoux-Jefferson City contact lies either within the *M. dianae* Zone or very low in the succeeding *Acodus deltatus--Oneotodus costatus* Zone, i.e., lower to middle Fauna D (middle Ibexian) of the North American Midcontinent Faunal Realm.

Solution effects in the Roubidoux Formation in the FLWMR area appear to be minimal in sandstone, but locally are pervasive in dolomites. No solution cavities were observed in sandstone outcrops; solution cavities were observed in approximately one third of dolomite outcrops. In addition, numerous irregular small folds and steep attitudes occur in Roubidoux sandstone beds that are interpreted to be the result of collapse due to the dissolution of interbedded or overlying dolomitic material. A comparison of the wide range of attitudes measured in Roubidoux sandstone beds compared with the nearly horizontal attitudes measured in the underlying Gasconade Dolomite in the same area (Fig. 4) can only be explained by dissolution of dolomite in the Roubidoux and subsequent collapse of sandstone beds. A similar conclusion was reached by Heller (1954) for Roubidoux beds throughout the Ozark area. A good field example of this phenomena can be found at data point #526 in SE1/4, SE1/4 sec. 35, T. 35 N., R. 11 W., Big Piney 7.5-minute quadrangle. There, well-indurated sandstone beds form an irregular plunging anticline, the limbs of which dip as much as 25°. This fold overlies heavily iron-stained, very friable sandstone and chert residual material.

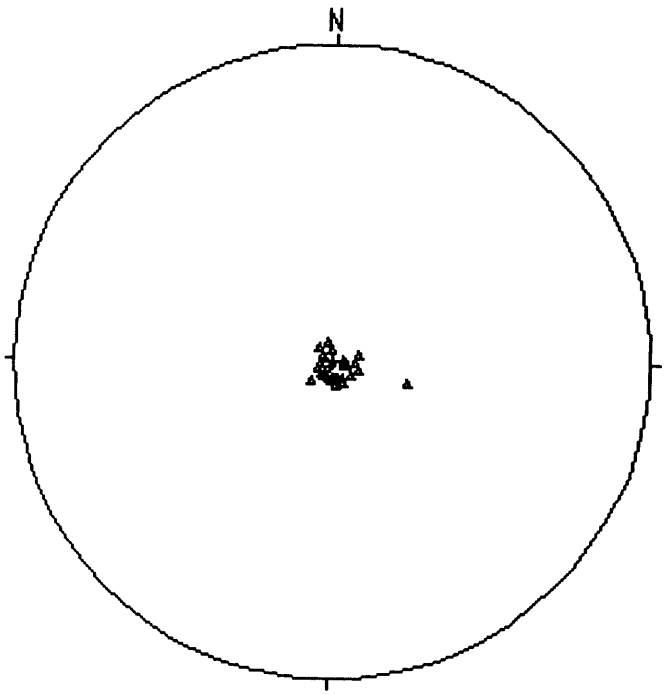
Jefferson City Dolomite

The youngest bedrock formation in the FLWMR area is the Jefferson City Dolomite of Winslow (1894). It occurs extensively in the uplands in the southern portion of the map area and as isolated outliers in the north. As much as 180 ft of this formation exists in the southern portion of the area. The only exposured contact with the underlying Roubidoux Formation observed in the mapped area is in the I-44 road cut west of the Saint Robert interchange, Waynesville 7.5-minute quadrangle (see fig. 1). There, banded chert of the Jefferson City Dolomite conformably overlies a thin oolite

Figure 4. Equal-area projection of: a) 92 poles to bedding (squares) and 9 fold axes (lines) for the Roubidoux Formation from an area north and northeast of the FLWMR Headquarters; b) 145 poles to bedding (triangles) for the Gasconade Dolomite in the same area. The relatively steep attitudes and folds in the Roubidoux Formation are interpreted to be the result of intraformational dissolution.



a)



b)

Figure 4.

layer and sandy dolomite of the Roubidoux Formation. Elsewhere, the contact was placed approximately 30 ft below the Quarry Ledge member (see below).

The Jefferson City Dolomite characteristically weathers to a yellowish tan to buff color and consists of thin- to thick-bedded, fine- to medium-grained, light-gray dolomite, thin- to thick-bedded, fine-grained, well-sorted sandstone, and chert. Thin partings of green to brown shale occur locally. Chert varieties are porcelaneous, sandy, banded, and oolitic and occur as irregular nodules in sandstone and in thin layers. Locally, chert beds are brecciated. The occurrence of chert nodules and the well-sorted grains of Jefferson City sandstones distinguish them from Roubidoux sandstones.

A massive bed of gray, fine-grained, argillaceous dolomite (cotton rock) containing quartz- and/or calcite-lined pits occurs approximately 30 ft above the base of the Jefferson City Dolomite throughout the FLWMR area. This bed is 20 to 30 ft thick and informally referred to as the Quarry Ledge member (Thompson, 1991). It is a resistant ledge-forming bed that commonly forms steeper slopes than surrounding strata.

No macrofossils were found in the Jefferson City Dolomite in the FLWMR area. A sample collected from near the base of the formation in SE 1/4, NW 1/4, sec. 27, T. 34 N., R. 12 W., Bloodland 7.5-minute quadrangle (approximate elevation- 1160 ft) and analyzed for conodonts by John E. Repetski (USGS, Reston, VA) yielded the species *Ulrichodina deflexa* Furnish which is limited to the middle and upper part of Fauna D (sensu Ethington and Clark, 1971) of the North American Midcontinent Faunal Realm and assigned a medial Early Ordovician, middle Ibexian age.

No solution cavities along bedding were observed in the 114 outcrops of Jefferson City Dolomite visited during this study, and in only 5 of the 216 fracture sets observed in the formation were solution widening effects noted. At several locations, broad areas of relatively pervasive seepage were found near the base of the Jefferson City. Several of these formed the headwaters of small drainages. Presumedly, this flow occurs along bedding planes in the thin-bedded strata below the Quarry Ledge member.

Structure

The FLWMR area is on the Ozark uplift, a region of relatively minor tectonism on the cratonic platform in the extreme foreland region of the North American Plate, far from orogenic margins.

Strata in this area are basically horizontal and deformation is generally confined to narrow zones of faulting. Plate 3 is a map showing regional structures and structural contours on the base of the Gasconade Dolomite, modified from Middendorf and others (1987) and Seeger (1989). Major faults in this region, which cut the Paleozoic section, directly overlie magnetic lineaments in the basement (Plate 3) and are interpreted as representing reactivation of structures in the Proterozoic basement. The most significant structural trends on this map are northwest-striking faults, such as the Jacksonville and Countyline faults, that closely correspond with elements of the Proterozoic Central Missouri Tectonic Zone of Kisvarsanyi (1984, 1987). Subsidiary structures include northerly and northeasterly trending faults and broad folds. Timing of faulting is only constrained as being post-Early Ordovician. The region is basically aseismic, with only one earthquake reported in the area since July, 1975 in the Central Mississippi Valley Earthquake Catalog (Herrmann, 1993)- a 2.0 body-wave magnitude event on 6/13/83. The epicenter was approximately 3 mi north of I-44, near the center of Plate 3.

Local Structure

Bedding attitudes within the boundaries of FLWMR are basically horizontal (Plate 4). Solutions to three-point problems derived from elevations of surface and subsurface geologic contacts consistently yield results of 1.5° dip or less. Attitudes steeper than 2° portrayed on the geologic map (Plate 1) are interpreted to represent local variations due to bioherm development or solution collapse.

Three faults were found within the FLWMR boundaries (Plates 1, 3, and 4). Of these, the most prominent is a N65W-striking fault that transects the southernmost portion of the reservation. It is interpreted to be a previously unidentified fault segment connecting the Countyline fault mapped to the northwest by Middendorf (1986) and the Palace fault mapped to the southeast by Summer and Easson (1986)(see Plate 3). Thus connected, this fault is continuous for more than 50 mi of strike length, and probably more if it is projected to an unnamed, on-strike fault mapped by Pratt and others (1985) in the Rolla 1° X 2° quadrangle. This structure, herein referred to as the Countyline fault, is characterized by scissor-like reversals in direction of displacement and a virtual straight-line trace which implies a near-vertical dip. Such characteristics are consistent with strike-slip faulting.

The Countyline fault was observed at two locations on the FLWMR. The first is located on the east bank of an unnamed tributary to Roubidoux Creek, on the FLWMR Bombing Range in SW1/4, SE1/4 sec. 14, T. 34 N., R. 12 W., Bloodland 7.5-minute quadrangle. There, the Gasconade-Roubidoux contact was abruptly down-dropped to the northeast approximately 60-70 ft. The fault surface is obscured by a 25 ft covered interval. No kinematic indicators were observed in the surrounding outcrops. The second location is approximately 9,000 ft to the southeast, on the north bank of Musgrave Hollow in SW1/4, SW1/4 sec. 19, T. 34 N., R. 11 W., Bloodland 7.5-minute quadrangle. There, a well-exposed faulted monoclinal fold occurs in sandstone of the Roubidoux Formation with about 20 ft of down-to-the-southwest displacement. Once again, the fault surface is obscured by a covered interval, but several subsidiary structures exist in the hanging wall exposure. These include: 1) a small thrust fault that has a few inches of throw, strikes N10W, dips 35° SW, and contains slickenside striations raking 90° in the plane of the fault; 2) a second larger thrust fault along horizontal bedding planes with an undetermined amount of throw and ramps that strike N20-25E, dip ~20° NW, and contain slickenside striations in a S75W direction; 3) chatter marks on top of a horizontal surface indicating a direction of motion towards S35W for the over-riding surface; and 4) closely spaced N15-20W vertical fractures with horizontal slickenside striations and filled with secondary mineralization.

A schematic cross section and plan view that illustrates the above data, and interpretative stress-strain ellipses for the observed deformation are shown in Figure 5. The subsidiary structures related to the Countyline fault at Musgrave Hollow are incompatible with a single deformational event. Rather, two separate events are indicated; one with a ENE-oriented maximum-principal-stress direction (σ_1), which was responsible for left-lateral strike-slip faulting along the Countyline fault and subsidiary WSW thrusting; and a second event that had a NNE-oriented σ_1 which was responsible for monoclinal folding along the Countyline fault with associated bedding-plane shear (chatter marks) and the NNW-trending fractures with horizontal slickenside striations. No cross-cutting relations were observed that could indicate the sequence of deformation. The orientations of σ_1 interpreted from deformation along the Countyline fault are very similar to orientations interpreted from deformation in Paleozoic rocks along the Cap au Gres structure in northeastern Missouri (Harrison, 1995), along the Ste. Genevieve fault in eastern

Figure 5. a) Interpretative stress-strain ellipses for structures observed along the Countyline fault, σ_1 is maximum-principal-stress direction; barbed line indicates orientation of thrust faults, half arrows indicate relative motion on strike-slip faults, dual arrows indicate orientation of monocline; two different horizontal principal stress (σ_1) directions are suggested from the observed structures; b) schematic plan-view map of Countyline fault at exposure in north bank of Musgrave Hollow in SW1/4, SW1/4 sec. 19, T. 34 N., R. 11 W.; same symbols as above, double-barbed half arrows indicate orientation of fractures containing horizontal slickenside striations; c) schematic cross section at same location; arrows indicate direction of relative motion; dashed vertical line indicates location of covered fault; towards and away indicate relative motion in respect to viewer; approximately 20 ft of stratigraphic displacement was observed across the structure.

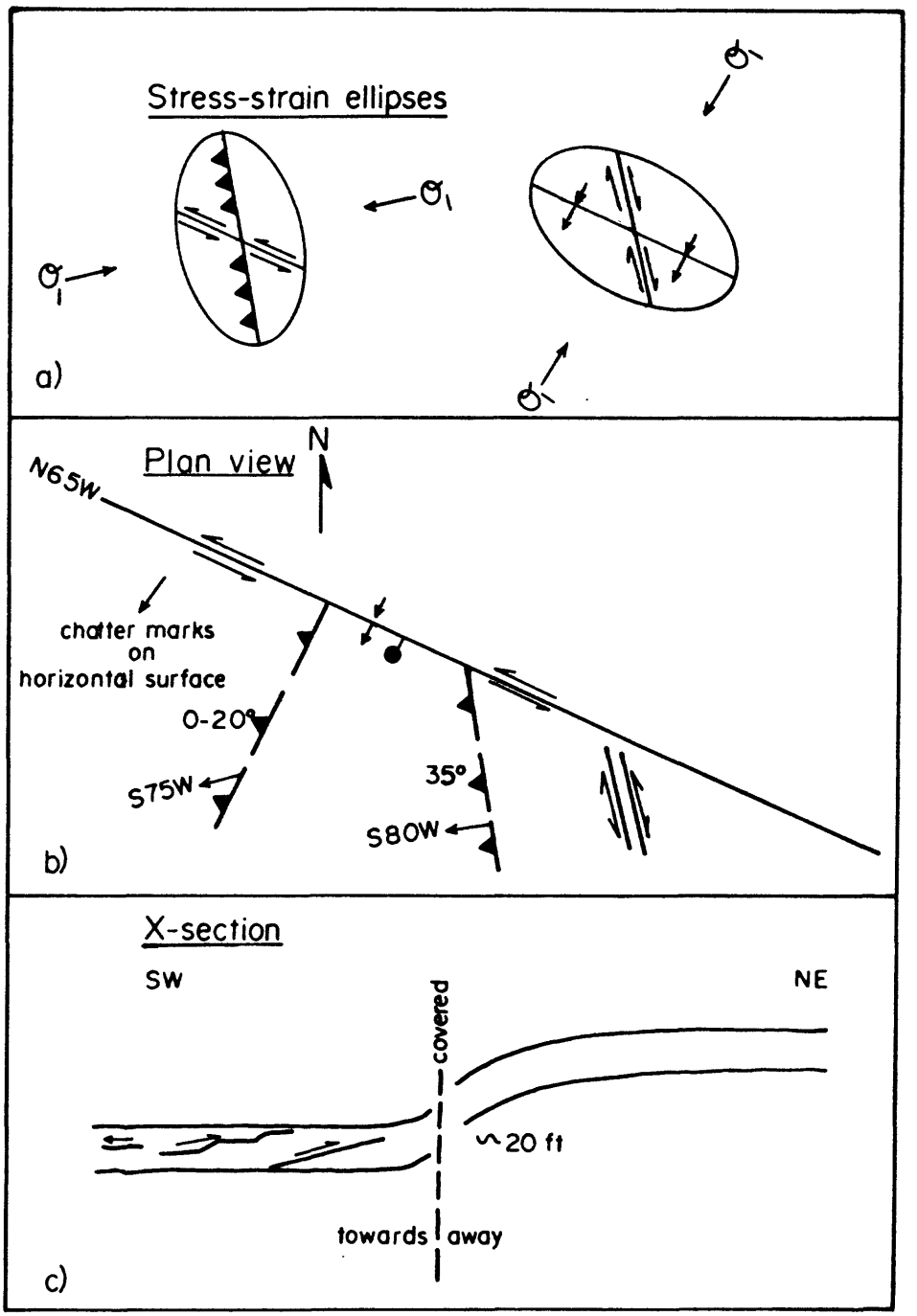

Stress-strain ellipses
a)
Plan view
N
N65W
chatter marks
on
horizontal surface
0-20°
S75W
35°
S80W
b)
X-section
SW
NE
covered
20 ft
towards
away
c)

Figure 5.

Missouri (Schultz and Harrison, 1994; Harrison and Schultz, 1994a), and along faults in the Thebes Gap area of southeast Missouri (Harrison and Schultz, 1994b).

Two other faults were identified in the southern portion of the FLWMR, both are to northeast-striking structures and both branch from the Countyline fault at steep angles to the northeast and southwest, respectively(Plates 1, 3, and 4). The southwest-branching fault has minor down-to-the northwest displacement and is interpreted as a probable extension of the Nelson Creek fault mapped in the Winnipeg quadrangle by Middendorf (1986). It was identified in the FLWMR on the basis of tectonic breccia and cataclastic shears. Vergence directions of shears and patterns of fractures associated with the Nelson Creek fault suggest that it is a right-lateral strike-slip structure, antithetic to the Countyline fault. The northeast-branching fault, herein referred to as the Hurd Hollow fault, had down-to-the-southeast motion and approximately 30-40 ft of stratigraphic separation. It is identified from the abrupt down dropping of the Gasconade-Roubidoux contact along Roubidoux Creek and Hurd Hollow. The fault surface is not exposed. In the east bank of Roubidoux Creek, a small monoclinal flexure dipping into the Hurd Hollow fault was mapped in the footwall. Prominent water sinks occur in both Roubidoux Creek and Hurd Hollow along the trace of this fault.

The Nelson Creek and Hurd Hollow faults appear to have served as hinges that accommodated deformation along the Countyline fault. To the northwest of their intersection, the Countyline fault is down to the southwest, southeast of their intersection the Countyline fault is dominantly down to the northeast.

A fourth fault was tentatively identified in the northwest portion of the FLWMR. Evidence for this questionable north-south-trending structure includes a consistent down-to-the-west lowering of the Gasconade-Roubidoux contact by about 50 ft across an interval approximately 2000 ft wide, and possible tectonic brecciation in the Gasconade Dolomite in the vicinity of Smith Branch. Alternatively, these phenomena could be explained by a belt of consistent dip (only about 1.4°), and solution collapse and brecciation. This matter remains unresolved.

Fractures

One of the primary objectives of this study was to evaluate the nature, occurrence, and geohydrologic role of fractures in the FLWMR area. The term fracture, as used in this report, refers to a

planar break in a rock, whether or not it causes displacement; this includes small faults having less than 1 ft of displacement and joints, which are fractures with no displacement. Larger faults having greater than 1 ft of displacement have been discussed previously and are technically also fractures. Individual fractures typically occur with other parallel fractures to form a fracture set. Outcrops were examined for number of fracture sets, spacing, persistence, orientation, aperture, seepage, infilling, and solution effects.

Number of fracture sets

A fracture set is defined as a significant number of fractures in an outcrop that have the same or similar orientation. In most cases, visual examination was sufficient to determine the number of fracture sets present. However in some cases, statistical analysis was necessary.

The number of fracture sets encountered in individual outcrops varied from none in some beds to as many as a dozen in others. On average, the Gasconade Dolomite contained 3.2 fracture sets per outcrop, the Roubidoux Formation contained 2.7 fracture sets per outcrop, and the Jefferson City Dolomite contained 1.9 fracture sets per outcrop.

Spacing

Spacing refers to the mean perpendicular distance between adjacent fractures in each fracture set. Descriptive terms used in this report are given in Table 1.

Table 1. Fracture spacing.

Term	Spacing
Widely spaced	> 6 ft
Medium or moderately spaced	2-6 ft
Closely spaced	< 2 ft

For portrayal on the geologic map (Plate 1), widely spaced fracture sets are shown as single thin lines, medium-spaced fracture sets as double thin lines, and closely spaced fracture sets as single thick lines.

Since the number of fractures in any set is directly related to spacing, weighting factors based on spacing were applied to all

analyses of fractures, including the generation of compass-rose diagrams. Closely spaced fracture sets were multiplied by a factor of 3, medium-spaced fracture sets by a factor of 2, and widely spaced fracture sets were given unit value. The term, weighted fracture sets, refers to fracture sets that have had the above spacing considerations applied to them.

Persistence

For this report, persistence is the degree to which individual fracture sets have propagated through an outcrop. Two levels of persistence occur in fractures in the FLWMR- through going and nonthrough going. Through-going fractures are those that cut the entire outcrop, i.e. they extend through multiple beds; nonthrough-going fractures are those that are confined to individual beds and do not extend into adjacent strata. On the geologic map (Plate 1), through-going fracture sets are portrayed as lines with boxes, nonthrough-going fracture sets are portrayed as lines.

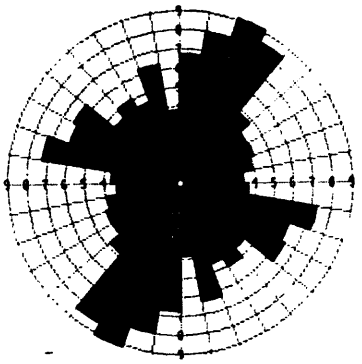
In the FLWMR area, nonthrough-going fracture sets are much more abundant than through-going in all three formations (Fig. 6). In Gasconade Dolomite, 89.5 percent of the fractures are nonthrough going, in Roubidoux Formation 95.2 percent are nonthrough going, and in Jefferson City Dolomite 90.3 percent are nonthrough going. It is noteworthy that many of the through-going fracture sets occur in the northwest part of the FLWMR, in proximity to segments of Roubidoux Creek and Smith Branch that are "losing" streams.

Orientations

Orientations of fracture sets observed at each outcrop were measured in the field with a Brunton compass and plotted as vector arrays on the geologic map (Plate 1). Vector arrays are drawn from a point of origin as a northern hemisphere azimuth for each fracture set.

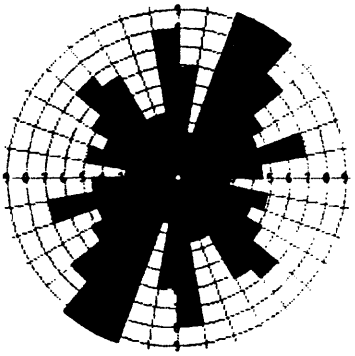
Analysis of fracture-set orientations may be useful in evaluating possible pathways of groundwater flow. In order to facilitate such analysis, compass-rose diagrams of weighted fracture sets partitioned by persistence and geologic formation were generated for the entire region (Fig. 6). This regional fracture-orientation data shows a large degree of variability. There is virtually no similarity of fracture orientations between the three formations in either nonthrough-going or through-going fractures. And except for Gasconade Dolomite, which shows one consistent regional orientation to the north-northeast, there is little similarity between nonthrough-going and through-going

Figure 6. Compass-rose diagrams of nonthrough-going and through-going fractures for each formation.

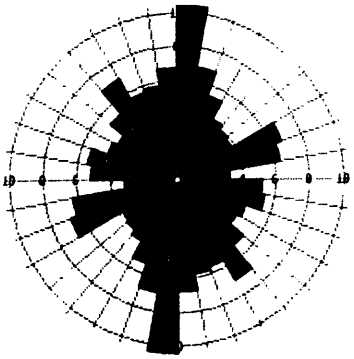


nonthrough-going fractures
n=2,484

Gasconade Dolomite

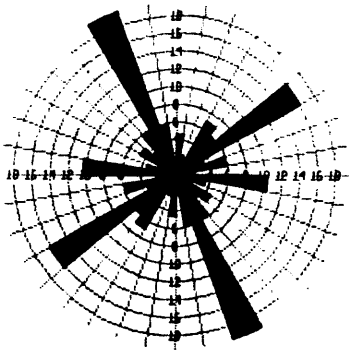


through-going fractures
n=290

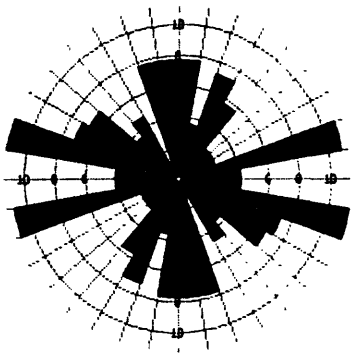


nonthrough-going fractures
n=1,740

Roubidoux Formation

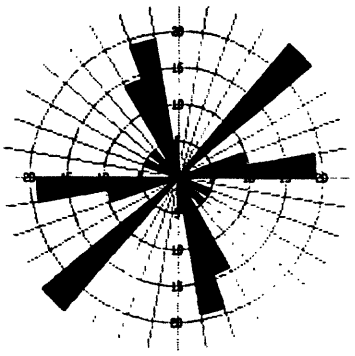


through-going fractures
n=87



nonthrough-going fractures
n=195

Jefferson City Dolomite



through-going fractures
n=21

Fig. 6

fractures within the Roubidoux Formation or Jefferson City Dolomite (Fig. 6). This suggests a different mode of origin for through-going and nonthrough-going fractures in FLWMR area.

Fractures along the Countyline fault were examined to evaluate a possible structural influence. A compass-rose diagram for weighted fracture sets, both through going and nonthrough going, within 3,000 ft of this structure (Fig. 7) shows a pronounced bimodal distribution along east-northeast and north-northwest orientations. Fractures having these orientations are interpreted to be of tectonic origin because they occur along the axis of extension for east-northeast compression and along a shear direction for north-northeast compression, respectively (see Fig. 5).

For further analysis, the mapped area was divided into ten domains having boundaries based largely on major drainage divides, and compass-rose diagrams were generated for each domain (Plates 5, 6, 7, 8, 9, and 10). A great degree of variability is also apparent in these domain groupings. It is evident that there are no consistent fracture orientations that extend over the entire FLWMR area. There are, however, several local observations that can be made from the domain data:

1) Nonthrough-going fractures in the Gasconade Dolomite (Plate 5) have pronounced north-south and east-west orientations in domains 4, 5, and 6; diffuse, but consistent, northeast orientations in domains 1, 2, 7, 8, and 9; and pronounced west-northwest orientations in domains 2 and 10;

2) Through-going fractures in the Gasconade Dolomite (Plate 6) have very diffuse orientations, especially in domains containing the largest populations (domains 1 and 7); domain 6 orientations are very similar to those seen along the Countyline fault (Fig. 7) and may be tectonic in origin;

3) Nonthrough-going fractures in the Roubidoux Formation (Plate 7) have a pronounced north-south orientation in domains 1, 2, 3, 6, and 10; bimodal orientations in domains 4 and 5 that reflect orientations along the Countyline fault (Fig. 7); domain 7 has a pronounced, but regionally anomalous, northwest orientation;

4) Through-going fractures in the Roubidoux Formation (Plate 8) have an overall low population and diffuse orientations with virtually none of the north-south fractures that are so prominent in nonthrough-going fractures in the Roubidoux Formation; domain 5 reflects orientations along Countyline fault (Fig. 7); domain 7 has a north-northwest orientation similar to domain 7 nonthrough-fractures (Plate 7);

Figure 7. Compass-rose diagrams of fractures within 3,000 ft of the Countyline-Palace fault; bars and balls along fault trace indicate the direction of offset at individual locations.

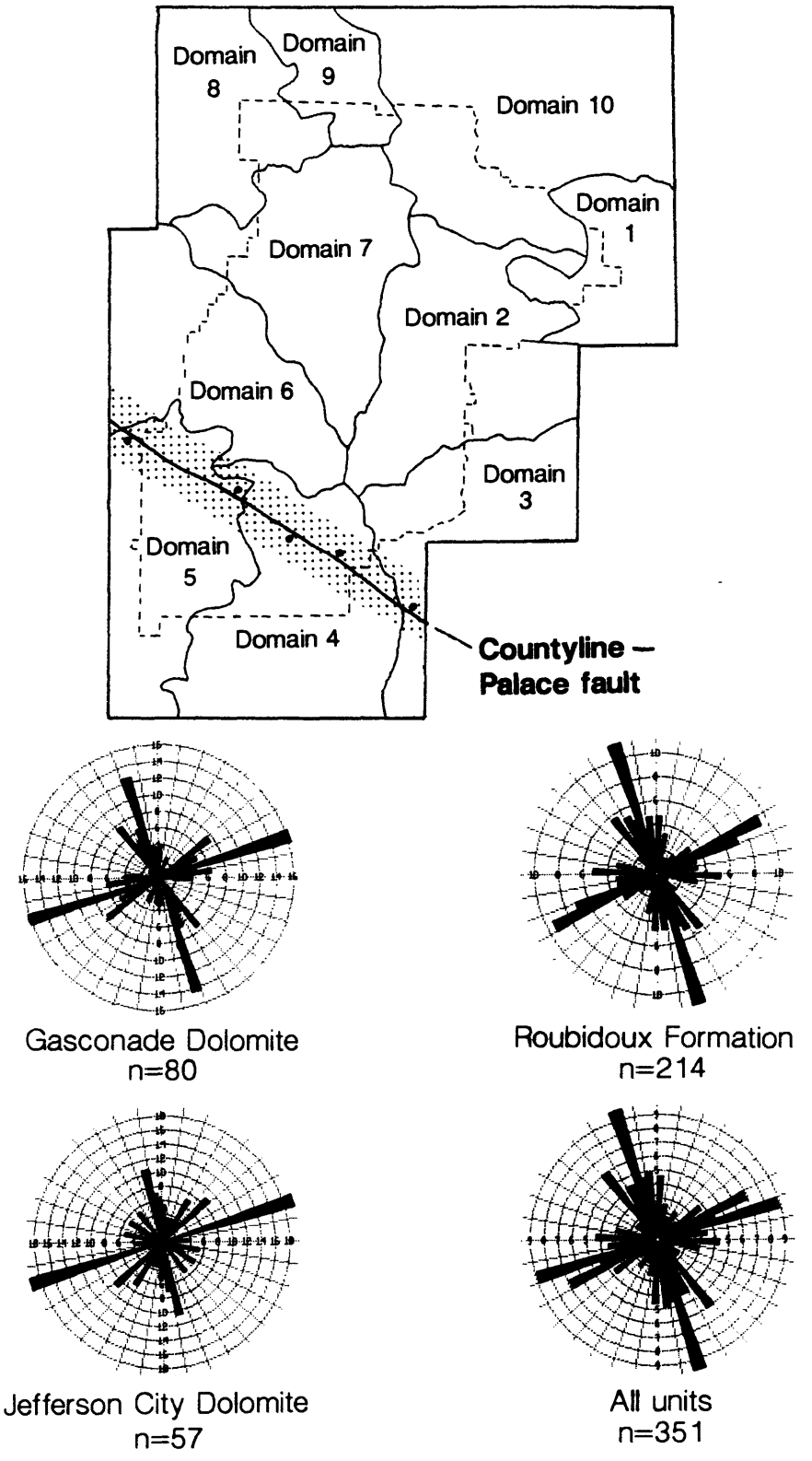

Domain 8
Domain 9
Domain 10
Domain 1
Domain 7
Domain 2
Domain 6
Domain 3
Domain 5
Domain 4
Countyline – Palace fault
Gasconade Dolomite
n=80
Roubidoux Formation
n=214
Jefferson City Dolomite
n=57
All units
n=351

Figure 7.

5) Nonthrough-going fractures in the Jefferson City Dolomite (Plate 9) have low populations and diffuse orientations in all domains, although east-northeast and west-northwest trends are recuuent; domains 4 and 5 indicate a probable reflection of fracture orientations along Countyline fault (Fig. 7);

6) Through-going fractures in the Jefferson City Dolomite (Plate 10) are significant only in domain 5, which indicates a reflection of orientations related to Countyline fault (Fig. 7).

Aperture

The mean perpendicular distance between adjacent walls of a fracture is referred to as the aperture. Fracture apertures were generalized for each set observed in the field, with descriptive terms shown in Table 2.

Table 2. Fracture apertures

Term	Aperture
Very wide	> 8 in.
Wide	2-8 in.
Moderately wide	½-2 in.
Narrow	< ½ in.

On the geologic map (Plate 1), **vw** was placed next to fracture sets with very wide apertures, **w** next to sets with wide apertures, **mw** next to sets with moderately wide apertures. No aperture symbol implies that fractures are narrow; greater that 98 percent of fractures in the FLWMR area are narrow.

Seepage

Fracture sets having minor water flow or visible moisture were noted in the field notes (Appendix A) and designated with an **s** on the geologic map (Plate 1). Such observations were subject to seasonal conditions.

Infilling

Fractures filled with secondary mineralization were described as closed in the field notes (Appendix A) and designated with a **c** on the geologic map (Plate 1). Greater than 98 percent of the fractures in the FLWMR area are open.

Solution effects

Solution effects, generally widening of fractures with pitted or sculptured walls and secondary mineral encrustations, were noted in approximately 20 percent of the fracture sets in the Gasconade Dolomite, approximately 1 percent of the sets in the Roubidoux Formation, and 4 percent of the sets in the Jefferson City Dolomite. A compass-rose diagram of weighted fracture sets, both through going and nonthrough going, that show signs of solution widening (Fig. 8) reveals a pronounced northeast orientation. This relation is deemed important in hydrogeologic considerations, because they provide direct evidence of water-flow pathways.

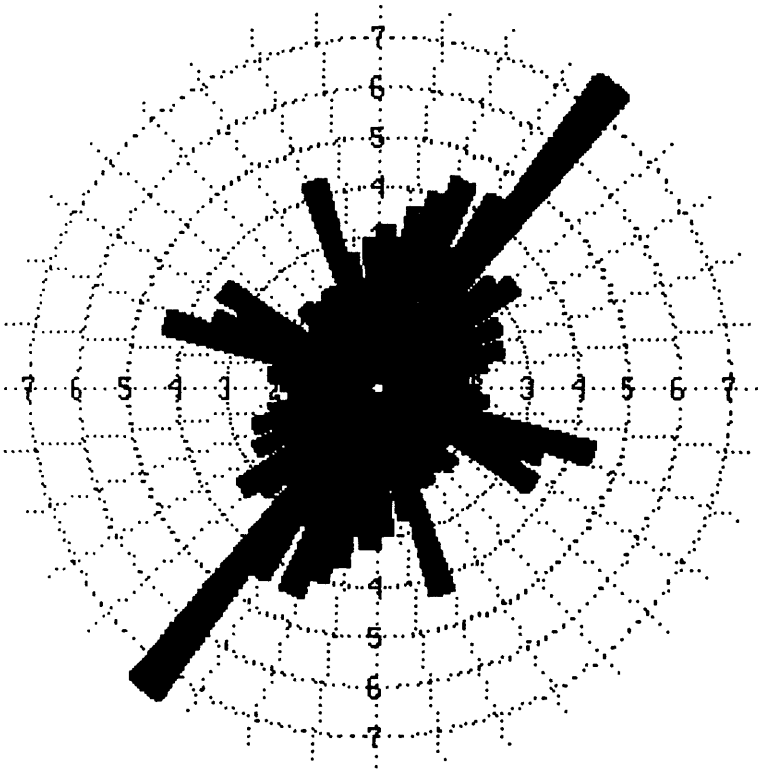
Karst Features

Karst development in the FLWMR area is demonstrated by sinkholes, caves, small solution cavities along bedding, sinking or losing streams, and abundant springs. Sinkholes were mapped in all three bedrock units and generally occur as closed depressions ranging from several feet to greater than 1,000 ft in diameter; those less than 200 ft in diameter as indicated by **k** on Plate 1. Most of the large sinkholes (greater than 200 ft in diameter) occur in the upland areas within the Roubidoux Formation and Jefferson City Dolomite. Sinkholes in the Gasconade Dolomite are generally tens of feet in diameter and many occur as amphitheater-like structures in the steeper terrain typical of the Gasconade. Several small sinkholes were noted in alluvium and terrace deposits in tributaries of Roubidoux Creek.

The morphology of sinkholes varies from closed depressions having gentle slopes in residual materials to closed depressions containing rock outcrops and having steep slopes. Several sinkholes contained open throats, whereas most exhibited closed throats and contained evidence of some soil piping. The amphitheater-like structures in the Gasconade Dolomite appear to be sinkholes that have been eroded on one side by streams.

One collapse sinkhole that has been studied in some detail occurs in the northwest corner of FLWMR, SE 1/4, SW 1/4, NW 1/4, NW 1/4, NW 1/4, sec. 1, T. 35 N., R. 12 W., Waynesville 7-1/2 min. quadrangle (David Hoffman, Missouri Division of Geology and Land Survey, unpublished data). This sinkhole was found in a wood-cut area and was reported to be 8 ft in diameter and approximately 100 ft deep. Its mouth occurs in residuum of the Roubidoux Formation and it extends into the underlying Gasconade Dolomite. Apparently it collapsed during an unusually wet period during the Fall of

Figure 8. Compass-rose diagram of solution-widened fractures from the entire mapped area.


7
6
5
4
7 6 5 4 3 3 4 5 6 7
4
5
6
7

1985. In 1995, the collapse structure had widened to approximately 20 ft in diameter and exposed highly weathered Roubidoux Formation in its steep walls. It is speculated that the sinkhole connects to Ballard Cave which opens in the Gasconade Dolomite along Roubidoux Creek about 4,000 ft to the northeast.

Catastrophic collapses in karst terrains of Missouri are fairly common and most occur in residuum or highly weathered bedrock (Williams and Vineyard, 1976). Catastrophic collapse developes through the upward migration a void beneath a soil arch in residual materials that directly overlies a solution pathway in carbonate bedrock (White, 1988). When the thickness of the soil can no longer sustain the arch, collapse occurs resulting in a cylindrical sinkhole. Williams and Vineyard (1976) reported 13 catastrophic collapses in remote timbered areas in Missouri during an unusually wet period in the Spring of 1973, under conditions similar to those active during the collapse sinkhole in FLWMR.

Most of the caves and springs observed in the FLWMR area were found in the Gasconade Dolomite. Generally, the larger caves occur in the coarser-grained dolomite in the upper strata, where a moderately high primary porosity is ubiquitous. All of the large springs in the area, Roubidoux, Miller, Stone Mill, and Shanghai, and most of the small springs issue from the lower part of the Gasconade. Both solution-widening of fractures and dissolution of strata along bedding has occurred in the Gasconade Dolomite, but the latter appears to be more prominent. Out of the 917 outcrops of Gasconade Dolomite inspected for this report, 413 occurrences of caves, small solution cavities, or vugs were noted, all of which were developed along bedding and showed no fracture control. In comparison, solution-widened fractures were noted in 186 of the outcrops.

Several streams in the FLWMR area lose water to an underground conduit system. Roubidoux Creek and the stream in Hurd Hollow lose much of their flow near the Hurd Hollow fault in the Bloodland 7-1/2 min. quadrangle. The flow of water decreases rapidly in gravel bars in these areas. Vineyard and Feder (1974) reported that Roubidoux Spring, 10 mi north at Waynesville, Waynesville 7-1/2 minute quadrangle, is recharged from this area. Roubidoux Creek, from the Hurd Hollow fault to an area near Roubidoux Spring, is typically dry although it has a floodplain consistent with areas of normal flow.

Conclusions

1)Gasconade Dolomite is the major near-surface aquifer in the FLWMR area. All of the large springs and most of the small springs issue from this formation. In addition, a large majority of the caves observedin the area were in the Gasconade Dolomite.

2) In the Gasconade Dolomite, dissolution of strata along bedding is more pervasive than solution widening of fractures, but both are considered to be of geohydrologic importance.

3) Extensive dissolution of carbonate material in the Roubidoux Formation has occurred locally. As a result of this, interbedded sandstone horizons are severely deformed into steeply dipping beds and asymmetrical folds.

4) Nonthrough-going fractures are more prevalent than through-going fractures. Both types have regionally diffuse orientations, and only locally do they show any consistent trends.

5) Faulting is minimal and largely confined to the southern portion of FLWMR. Fractures in the vicinity of this faulting have pronounced bimodal orientations and are interpreted to be tectonic in origin. The Hurd Hollow fault appears to affect surface hydrology, as both Roubidoux Creek and Hurd Hollow Creek become losing streams near it.

6) Fractures that are distal to faults are interpreted as nontectonic in origin and owe their existence to stresses developed through denudation. Their highly varied orientations and the predominance of nonthrough-going charactistics is attributed to different elastic properties and rock strengths of individual beds.

7) Solution-widened fractures have a strong preferred orientation to the northeast, interpreted as direct evidence for water-flow pathways.

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Appendix A. Field notes. f- fractures, vertical and narrow unless noted, restricted to individual beds unless noted as through going; widely spaced- >6 ft, medium spaced- 2-6 ft, closely spaced- <2 ft; very wide- > 8 in., wide- 2-8 in., moderately wide- ½-2 in., narrow- < ½ in.

11/6/94 Waynesville 7 ½' quadrangle

1) Ojc thinly bedded dolomite; irregular chert nodules; horizontal; f: medium spaced N20E 75SE; widely spaced N30W 82-85NE

2) Ojc Quarry Ledge; massive, pitted, fetid, fine-grained dolomite (cotton rock); horizontal; f: widely spaced N60W, very widely spaced N45E

3) Ojc beds below Quarry Ledge; thinly bedded, medium-grained dolomite with bands and nodules of chert; thin shale bed; f: widely spaced N60W and N45E

4) Or massive, fine-grained sandstone; poor exposure, no reliable structural data

5) Ojc Quarry Ledge and thin beds below; irregular chert nodules; abundant secondary calcite; horizontal; f: widely spaced N42E

6) Ojc Quarry Ledge; horizontal; f: wide N50W 82SW **through going** and filled with brown clay and fragments, perhaps 6-12 inches of reverse movement

7) Og massive, medium- to coarse-grained dolomite and minor chert; horizontal; f: abundant, closely spaced N-S to N20W; widely spaced N40E with red Fe-oxides

8) Og ~100 ft east of 7); 20-25 ft-wide karst breccia

9) Og thinly bedded, medium-grained dolomite, rotten-weathered appearance; intercalated chert; N20E 3NW; f: closely spaced N35-40E

10) Og thinly bedded dolomite and chert; basically horizontal with low-amplitude rolls over bioherms; f: abundant interbed fracturing, but highly variant orientations and no reliable trend

11) Og similar to above

12) wide area of residuum, Og and Or float

13) similar to above

14) Og medium-bedded, medium-grained dolomite with 1-3 in. shale seams; minor solution cavities; N35E, 6NW; f: very wide N75W at west end of outcrop, poorly developed elsewhere

15) wide area of residuum, Or and Og float

17) same as above

18) residuum and colluvium; Or and Og float

19) Or over Og; horizontal; f: widely to medium spaced E-W and N65E, solution widened

20) Og massive, medium-grained dolomite; horizontal; f: widely spaced N75E, solution widened

21) Og massive, thick-bedded, medium-grained dolomite; horizontal; f: medium-spaced N70E 77NW

22) Roubidoux Spring several thousand gal/m coming out of upper Og; Og is craggy with solution cavities, but no apparent through going fractures; overlying massive thickly bedded horizon has weak, poorly developed N20E fractures and at least two small caves

23) Og thick-bedded, massive, medium-grained dolomite; several horizons of intraformational breccia; N80W 3NE; f: poorly developed, widely oriented

24) Og N20E fracture-controlled(?) draw

25) Og thick-bedded, massive medium-grained dolomite and chert; horizons of intraformational breccia; craggy; horizontal; f: medium- to closely spaced N10E to N10W, some healed with dolomite

26) Og thick-bedded, medium- to coarse-grained dolomite; horizons of intraformational breccia; basically horizontal with bioherm rolls; small spring, few gal/m f: very poorly developed fractures with random orientations

27) Og similar to above with minor chert; local cross bedding; N40W 7NE; no fractures

28) wide area of residuum

29) Og massive, medium-grained dolomite; bluff former; fine to coarse vugs; poorly developed to no fractures; sample # 11/6/94-1

30) Og cave w/N80E opening direction, ~10 ft wide; intraformational breccia above opening; no fractures

31) Og karst breccia, ~ 15-20 ft-wide collapse area

32) Og same horizon as above; cave with ~12 ft-wide opening, N80E direction

33) Og massive, medium-grained dolomite; intraformational breccia and possible collapse areas; N-S 3E; f: one **through going**, moderately wide N35E 82NW

34) Og same horizon as above; f: moderately wide N30W, 72SW

35) wide area of residuum

36)-37) wide area of residuum and colluvium

38) Og small outcrop of cherty dolomite; horizontal

39) wide area of residuum and colluvium along side of Burchard Hollow; Og and Or float

40) same as above on south side of Burchard Hollow

41) road cut in residuum of Og

42) road cut in residuum of Or, abundant quartz sand

43) residuum and colluvium along both sides of draw; no outcrops; float of Or sandstone

44) residuum of Or

45) residuum of Or

46) residuum of Or

11/8/94 Waynesville 7 ½' quadrangle

47) Ojc thin-bedded, fine-grained dolomite and intercalated chert; minor seepage (heavy rain 3 days previously); horizontal; numerous fractures with many orientations

Brownfield 7 ½' quadrangle

48) Or medium-bedded, fine-grained sandstone and orthoquartzite; poor questionable outcrop, but consistent N80E 44-50SE attitudes suggest that rock is in place; few cataclastic shears(?) with variable orientations; west of mapped area

49) Or thin-bedded, quartz sandstone, sandy dolomite, and chert; pebbles at base of sandstone beds; N50E 16NW; poorly developed fractures; west of mapped area

50) residuum of sandstone and chert; west of mapped area

51) float boulders of Or; dense, hard fine-grained orthoquartzite; some brecciation; Druse outer surfaces

52) float boulders off Or; oolitic sandy chert; common druse

53) float blocks of boulders of ooltic orthoquartzite and sandy chert

54) Or bedded chert, 3'+ thick; N65W 5NE; f; closely spaced N85E to E-W

55) residuum and colluvium

56) Og sequence uphill, see Figure 1:
E Bed: approximately 15 ft above terrace level; medium- to thin-bedded, medium- to coarse-grained dolomite; numerous small solution cavities; approximately 20 ft thick; N15W 7SW; f: N34W, N15W, N62E, N75E, N55E, N10W, N30W, N25W, N80E very wide, N50E, N60E, N10W, N70E, N50E, N40E, N72E, N13W;
D Bed: ~6 ft of stromatolith chert; Druse; thin, plate-shaped vugs; f: closely spaced N30W, N70E
C Bed: 6-10 ft ledge of medium-grained, massive dolomite;

numerous solution cavities; f: closely spaced, N73E 88SW healed; N70E, 85SW; N70E solution widened; N36W moderately wide; N5W mod. wide; N32E very wide; N30W; N63E mod. wide; N25W; N20E; N52E very wide solution widened; N25W; N25W; N25W; N20E; N80E very wide solution widened; N58E wide solution widened; N40W; N85E; Note: fractures in this bed do not continue into underlying chert

B Bed: 15-20 ft ledge; medium-bedded, fine-grained dolomite; abundant solution cavities and vugs; some intraformational chert breccia; 20 ft-wide collapse zone with Mn-oxides; f: poorly developed fracture pattern, a N55E, 1-2 ft-wide crevasse, 10 ft high, lined with secondary carbonate mineralization- does not extent through full height of bed

Covered interval 10-20 ft

A Bed: 15-20 ft ledge; thin-bedded, fine-grained dolomite; local cross bedding; common solution cavities; upper 6 ft is dolomite-sandstone-chert breccia; N15E 7-20NW; f: moderate to widely spaced along well developed N70E trend

Or

C Bed: 4-5 ft ledge; thin- to medium-bedded quartz sandstone; N20E 18°NW flattening towards the west; f: closely spaced, well-developed, narrow to wide N20W 70NE, and N50E; fractures do not continue into underlying bed

B Bed: 3-4 in. sandy chert breccia

A Bed 1-2 ft orthoquartzite; f: closely spaced N35-45 W

57) float boulders of Or sandstone with chert nodules; numerous mud cracks and/or tubular burrows; west of mapped area

58) float boulders of massive, dense, oolitic chert, Or; west of mapped area

59) float boulders of thin-bedded quartz sandstone; west of mapped area

60) float boulders of quartz sandstone and sandstone breccia; west of mapped area

61) Ojc small outcrop in road cut; N41E 6SE; f: one prominent at N6W; horizontal striations (?); west of mapped area

62) Ojc small road cut outcrop; N31W 13SW; f: dominantly N6W, subsidiary N80W 78NE

63) Ojc quartz sandstone; N75E, 5SE; f: closely spaced N-S to N10W, and E-W

64) float boulders of quartz sandstone

65) same as above

66) Ojc questionable outcrop of thin-bedded, fine-grained dolomite; E-W 5N; west of mapped area

67) Ojc (?) small road cut outcrop; thin-bedded, medium-grained limestone?; sample 11/8/94-1; west of mapped area

68) numerous float boulders of oolitic sandstone; west of mapped

69) Ojc small outcrop of quartz sandstone in road bottom; west of mapped

70) float boulders of massive quartz sandstone

71) Ojc quartz sandstone; f: poorly developed N30E

72) wide area of quartz sandstone float along sides of road

73) Ojc small outcrop of sandstone in road cut; f: medium-spaced, narrow to wide, well-developed N50-55W

74) road cut of Ojc residuum (chert and punky, Fe-stained, leached dolomite) overlying boulders of Or sandstone

75) Ojc quartz sandstone; broad anticline, axis N70E, limbs dip at 7-14°; f: closely spaced N45-50W, N70E to E-W

Winnipeg 7 ½' quadrangle

76) wide area of quartz sandstone float

77) Ojc massive, fine-grained, well-sorted quartz sandstone; horizontal; f: medium spaced N-S

78) Ojc massive quartz sandstone; local ripple marks and chert nodules; horizontal (?); f: medium spaced N10-15E, N75W

79) Ojc thin- to medium-bedded, fine-grained quartz sandstone; N20W 14°NE; f: widely spaced N14-20W

80) Ojc quartz sandstone and orthoquartzite; horizontal; f: blocky, medium-spaced N50-55E and 65-70W

Roby 7 ½' quadrangle

81) quartz sandstone float

82) Ojc thin-bedded, massive dolomite; f: widely spaced N80W 90-55°SW some open, some closed

83) Or 1 ft silicified oolitic sandstone

6-10 ft very thinly bedded, sandy dolomite w/ mud cracks

15-20 ft thin-bedded quartz sandstone; ripple marks; f: closely spaced N10-15E

15-20 ft very thinly bedded, plately dolomite; local box work solution features; f: poorly developed E-W

11/10/94 Waynesville 7 ½' quadrangle

84) Or upper bed: 6 ft thin-bedded chert, sandstone, and shale with poorly developed irregular fractures;
middle bed: 6 ft medium-bedded quartz sandstone with blocky fractures
lower bed: 8 ft cherty dolomite with irregular N30E fractures

fractures in middle bed- see Figure 2; N55E, N43W, N15W, N13E, N55W, N-S, N26W, N12W 85SW, N23E, N60W 85SW, N55E, N15E 85SE, N10E, N10E, N60W, N70W, N65E, N60W, N55W, N63W, N60E, N65W 70-83NE, N20E 65NW, N82E 85SE, N65W 85NE, N10E, N10E, N13E 83SE, N65W 85NE, N54W, N-S, E-W, N63W, N18W, N59W 87NE, N18W, N3W, N15W, N65W 85NE, N3W, N15W

bedding is irregularly folded-attitudes from north to south: horizontal, N65E 5NW, N10E 17NW, N20E 12SE, N45W 19SW, horizontal, N40W 7SW, N65E 18-25SE

11/11/94 Waynesville 7 ½' quadrangle

85) Or eastern 1/3 of I-44 outcrop; thin-bedded, sandy dolomite overlying gray-white banded chert; intervals of strong Fe-ox; basically flat with small rolls over bioherms; intense, irregular fracturing, esp. in chert with no preferred orientations

86) Or central 1/3 of outcrop; thin-bedded chert and sandstone with chert; common Fe-ox; seepage (rained two days previous); f: very widely spaced N30W

87) western 1/3 of outcrop; Or thin-bedded chert, dolomite, and very minor sandstone; strongly fractured with no preferred orientations;

Og massive, medium-grained dolomite; horizontal; f: closely spaced N40-60W, N75W vertical ± 10°

88) residuum, float blocks of chert (some tripolitic) and lesser quartz sandstone

89) Og medium-grained, rotten dolomite; strongly weathered outcrop; f: tentative N65-75W

90) Og ~25 ft ledge of massive dolomite overlying 10'+ thin- to medium-bedded dolomite; intraformational breccia; N75W 4NE; 20-25' overhang with waterfall at north end of outcrop; f: irregular with no consistent orientation

91) Og Ballard cave, overhang opening 20-25 ft wide; T's to N50E trend about 50 ft in; no through going fractures, however N55W solution trend at mouth; ponded water

92) Og several ledges of thin-bedded dolomite overlying medium- to thick-bedded dolomite; stromatolith; horizontal; f: widely spaced N75W and N25E

93) Og about 30 ft below 92); 10 ft ledge of massive, thick-bedded dolomite; f: medium-spaced, solution-widened N10E

94) Og 25 ft bluff of massive, thick-bedded dolomite; numerous small caves < 6 ft deep; horizontal; very widely spaced, irregular fractures

95) Og medium-bedded dolomite; very craggy; abundant intraformational breccia; N60E 6NW; widely spaced irregular

fractures

96) Og 15 ft ledge of medium-bedded dolomite; minor chert; local intraformational breccia; N15E 4NW; f: medium-spaced N70E and N70W solution widened

97) Og 25-30 ft bluff; medium- to coarse-grained dolomite; numerous small caves and solution cavities along beds of intraformational breccia; many small seeps; horizontal; f: very widely spaced N50-55E

98) Og 40 ft bluff; medium-bedded, medium-grained dolomite; several small caves and solution cavities; horizontal; f: wide to medium-spaced N35-40E

99) Og Spring; about 25 ft below massive bluff-forming horizon; fractured cherty dolomite; few hundred gal/m; no prominent fractures

100) Og small spring in draw; few gal\m

101) Og medium- to thin-bedded dolomite and chert; N60E 5NW; f: sparse, widely spaced N10W to N25E

102) Og massive bluff-former horizon; several beds of intraformational breccia; common small caves, ledges, and solution cavities; small seeps; N75W 4NE; poorly developed inconsistent fractures

103) Og erosional embayment in bluff or collapse area; poor exposures, but several fractures at N40E and N20W

104) Og interbedded massive dolomite and intraformational breccia; breccia are typically eroded to form ledges; numerous solution cavities; white secondary mineralization common; horizontal; very widely spaced, inconsistent fractures

105) Og several caves with opening > 5' in diameter at embayment in bluff line; f: medium spaced N20E

106) Og embayment in bluff line; at least one visible cave; pinnacles with solution windows; E-W 5N; f: medium spaced, solution widened N-S to N30E

107) colluvium and residuum, red Fe-stained material with cobbles of chert and dolomite

108) Og medium-bedded, fine- to medium-grained dolomite; horizontal; f: widely spaced E-W

109) Og similar rock as above; f: widely spaced N60W

110) Og thick- to medium-bedded dolomite and chert; numerous small solution cavities; horizontal; f: medium to closely spaced N30W

111) Og 4-5 ft bed of medium-grained dolomite overlying thin-bedded dolomite and chert; horizontal; f: medium spaced N-S

112) Og medium- to very thin-bedded dolomite and chert; small spring; E-W 2-3S; f: blocky, N65E, N88E, N50E, N15W, N50E, N15W, N50E, N11E, N50E, N23E, N10W

113) Og 10 ft ledge of relatively massive dolomite; vuggy with some larger solution cavities; several small caves; 1 to 3 ft of stromatolitic chert at base; f: medium spaced in chert, N20E, N40W, N40W, N20E, N40W, N30E

114) Og cave in bluff 40-50 ft high; ledge overhang ~50 ft wide and 30 ft deep; 4-6 ft wide cave extends fron back at S15W for at least 30 ft, dripping water; no open fractures in roof; medium spaced N10-40W fractures adjacent to portal

115) Og same horizon as 114) about 400 ft east; f: in chert bed, medium spaced N60W and N40E

116) Og small outcrop in bottom of road; medium-grained dolomite; horizontal; f: numerous anastomosing N15E trend

117) Og small outcrop in road bottom; medium-grained, strongly weathered, punky dolomite; f: medium to closely spaced N10E

118) Og thin-bedded, medium-grained dolomite with chert nodules; horizontal; poorly developed, inconsistent fractures

119) Og thin-bedded chert and dolomite with chert nodules; strongly weathered; basically horizontal; numerous inconsistent fractures

120) Og thin-bedded dolomite; horizontal; f: closely spaced, solution widened N30E

121) Or very thin-bedded chert, dolomite, and minor sandstone; mudcracks; horizontal; inconsistent fractures

122) Or medium-bedded, medium-grained dolomite; slightly sandy; f: widely spaced N80W

123) Or thin-bedded sandy dolomite; mudcracks; tubular borrows; N70E 6NW; inconsistent fractures

124) residuum, sandstone float blocks

125) similar to above

126) Or fine-grained quartz sandstone; f: medium spaced N70W

12/2/94 Waynesville 7 ½' quadrangle

127) Or rubblely outcrop of red sandstone; no reliable structural data

128) residuum of Or(?) in road cut

Devils Elbow 7 ½' quadrangle

129) residuum; sandstone

130) Or orthoquartzite and white chert; f: medium spaced N50-55W 70-90NE and N20E

131) Or(?) 5 ft diameter boulders of red, brecciated chert in road bottom; in place?

132) Og thick-bedded, medium-grained dolomite with white and gray chert lens and pods; numerous solution cavities along bedding places; f: medium to closely spaced, very wide (solution widened) N10-20E

133) Og 15-20 ft ledge of medium-grained dolomite overlying 1-2 ft of white chert overlying bioherm horizon in creek bottom; N55W 3-4NE; f: medium spaced, solution widened N10-20E and narrow N70W

134) Og thin-bedded dolomite and chert; E-W 4N; f: medium spaced, solution widened N10W and N55W

135) Og 25-30 ft bluff of medium-grained dolomite and chert; seep line; horizontal; f: medium spaced N10E and N70W

136) Og thin-bedded dolomite; small 2-3 ft deep caves; f: medium spaced N20E and N65-75 W

137) Og medium-grained dolomite and white chert breccia; numerous small caves as much as 4 ft deep; N10E 2-4NW; f: medium spaced N10E and solution widened N60-70W

138) residuum/colluvium; no outcrops

139) Og thin-bedded dolomite; N-S 3W; f: medium spaced N20W, N70W, and N30-40E trends

140) Og 6 ft ledge about 12 ft above road level; medium-grained dolomite; f: closely spaced N10E, locally with strong solution widening

141) Og 6-10 ft ledge of thin-bedded dolomite overlain by white and gray bedded chert; f: well developed, closely spaced N70W and N-S to N10W

142) Og medium-grained dolomite; 12 ft-wide collapse structure; f: medium spaced N-S and N60-70W

143) residuum/colluvium; Og and Or float

144) Og strongly weather dolomite; no reliable structural data

145) Og small outcrop of dolomite in road cut; f: poorly developed N30E

146) Or poor outcrop in road cut; fine-grained quartz sandstone; N70W 16-55SW; f: medium to closely spaced N70W

147) Og small outcrop of medium-grained dolomite and chert

148) residuum/colluvium; Og and Or float

149) Og thin- to medium-bedded dolomite; several small solution cavities; horizontal; f: poorly developed N10-20E and N65E

150) Og medium-bedded dolomite; small springs; f: medium to closely spaced, wide N70-80W

151) residuum/colluvium; hill striped of vegetation, no outcrops

152) 20-30 ft of residuum/colluvium; earth-moving project underway

153) Og medium-grained dolomite; f: medium spaced N70W

154) Og medium- to thick-bedded dolomite; numerous solution cavities along bedding; horizontal; f: medium spaced N70-75W and N-S

155) Og 40 ft-high face in old quarry; medium-bedded dolomite and bedded chert; chert appears crumbly; horizontal; Fe-oxides common; f: at east end, closely spaced, wide N10E with crossing medium spaced N70W

156) Og 30-40 ft-high bluffs; thick- to thin-bedded dolomite; few small seeps; f: (?) along N40E bluff face

157) Og medium-grained dolomite; f: medium to widely spaced N35E and N80W

158) Og medium-grained dolomite; several small caves (1-2 ft diameter) along horizon 12-15 ft above creek level; N25E 4°NW f: numerous but inconsistent

159) Og medium-grained dolomite; pinnacle outcrops; f: wide E-W **through going**

160) Og medium-grained dolomite; pinnacle outcrops; several small caves

161) Og Shanghai Spring (a.k.a. Blue Springs); several thousand gal/m; massive, bluff-forming dolomite above spring; f: very wide, **through going** N25W 82NE directly above spring, remainder of bluff face is fracture free; Bretz (1956) indicates that this spring issues from a small cave

162) Og thick-bedded, medium-grained dolomite; f: medium spaced N20-25W and N75W

163) small seepage along road feeds small stock pond; no outcrop

164) small spring ~100 ft east of 163) feeds same pond; no outcrop

165) Og 3-6 ft-high ledge of medium-grained dolomite; small solution cavities common; horizontal; f: widely spaced N80W to E-W solution widened, N45-50E solution widened

166) colluvium/residuum

167) small spring, no outcrops

168) residuum\colluvium; no outcrops; Og float

169) Or thin-bedded chert; bioturbation features; N50E 24NW paleokarst?; f: very closely spaced N55W, N70W

170) Or oolitic chert and sandy dolomite; locally fossiliferous, snails and brackiopods; f: medium spaced N25E and N70W

171) Or white and gray, Druse chert, oolitic in part, overlain by coarse-grained dolomite; slightly fossiliferous, gastropods(?); shattered outcrop from blasting railroad cut

172) Og outcrop in creek bottom; medium-grained dolomite; numerous solution cavities, principally along bedding surfaces; horizontal; f: medium spaced N70W and N-S

173) Og coarse- to medium-grained dolomite; several small caves 1-3 ft in diameter; very minor seepage; horizontal; f: wide to medium spaced N75W, N-S, and N40E

174) Og thin-bedded, chert-free dolomite; horizontal; f: wide to medium spaced N65-80W and N40E

175) Og medium-bedded, medium-grained dolomite; f: closely spaced wide to very wide N65-80W

176) Og medium-bedded, coarse- to medium-grained dolomite; several small solution pockets or caves; N70E 4NW; f: medium spaced N80W

177) Og outcrop in creek bottom; medium-grained dolomite; f: closely spaced, very wide, solution widened N80W to E-W and N20W

178) Or/Og contact approximately 2/3 up hill; sandstone over dolomite; f: in Og, closely spaced, wide N20E and N80W

179) residuum\colluvium; dominantly Or sandstone float

180) same as above

181) Og thin-bedded, medium-grained dolomite; N80E 3-4NW; f: medium spaced N30W and N30E

182) Og outcrop in creek bottom; medium-grained dolomite and white chert; f: closely spaced N75W, N50W, and N20E

183) Og 4-5 ft ledge about 30 ft above creek; medium-bedded dolomite; horizontal; f: medium spaced N50-60W and N20E

184) residuum\colluvium; Og and Or float

185) same as above

186) Og 4 ft ledge; medium-grained dolomite; horizontal; f: medium spaced N70-75W and N20E

187) residuum\colluvium; no outcrops; Or and Og float

188) same as above

12/3/94 Devils Elbow 7 ½' quadrangle

189) Or poor exposure of chert in road cut; no reliable structural data

190) Og massive, thick-bedded dolomite; 30-40 ft-high cliff; several small cave-ledges; small spring 10-15 ft above creek level, few gal/m; f: face of cliff probably fracture controlled at N-S

191) Og thin-bedded dolomite below 190); N15W 3SW; f: medium to wide spaced N75W to N80E and N20W

192) Og medium- to thin-bedded, medium-grained dolomite; sparse

chert; cave with 6 ft diameter opening, at least 15 ft deep, N85E opening direction; f: medium to wide spaced N75W, N-S, and N40E

193) Og medium- to thin-bedded dolomite; several overhangs of possible solution origin; basically horizontal; f: medium spaced N20E, N15W, and N70E

194) residuum\colluvium; no outcrops; Or sandstone float

195) Og dolomite; small seepage; f: medium spaced N70W and N40W

196) residuum\colluvium; no outcrops; Or float

197) Or thin-bedded, Druse chert; white, red, and gray; Fe-oxides common; E-W 15N; f: strongly fractured, dominantly N25E, subsidiary N30-50W

198) Or small sandstone outcrop in road bottom; horizontal; f: N25E and N55W

199) residuum\colluvium; sandstone float

200) same as above

201) residuum; numerous massive sandstone boulders

202) residuum\colluvium; heavy Or sandstone float

203) same as above

204) Or questionable outcrop, but attitudes are consistent; massive quartz sandstone; E-W 14°N; f: widely spaced N25E and N45-50W

205) residuum\colluvium; Or sandstone and chert float

206) same as above

207) same as above

208) same as above

209) Or thin-bedded, red, quartz sandstone with minor chert; chert

is sandy, brecciated, and white to light gray; widely variable attitudes; f: medium spaced N10-20E and N40W

210) residuum\colluvium; Or sandstone float

211) Og several small ledges of medium-bedded, medium-grained dolomite; numerous solution cavities; basically horizontal; f: medium spaced, solution widened N70W to E-W and N20E to N-S

212) wide area of residuum\colluvium; no outcrops; Or and Og float

213) Or ledge of massive quartz sandstone and chert breccia; f: widely spaced, dominantly N25E, lesser N35W and N85W

214) Or massive sandstone; f: medium spaced N25E

215) residuum\colluvium; no outcrops; Or sandstone and chert float

216) Or massive quartz sandstone; f: N25E Fe-stained, and N55E and E-W

217) Or massive, fine-grained quartz sandstone; N30W 11NE; f: medium spaced N10W

218) Og thin-bedded, medium-grained dolomite; numerous solution cavities; N50E 5SW; f: medium spaced N15E and N60W

219) Or rubblely outcrop of quartz sandstone and chert; no reliable structural data

220) Og 5-6 ft ledge of fine-grained dolomite; numerous solution cavities; N50W 4NE; f: medium spaced, narrow to mod. wide N40-60W and N15E

221) residuum\colluvium; Or float

222) Og good exposure in creek bottom; basically horizontal, dipping slightly upstream;

thin-bedded dolomite; f: closely spaced N65-75 W and N25E

2-3 ft stromatolitic chert

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massive, thick-bedded dolomite; numerous solution

cavities; f: widely spaced N25E and N75W

223) Og approximately 100 yds upstream from 222); same horizon; f: very closely spaced N75W (strong trend) and subsidiary N25E

224) Or/Og 40 ft-high bluff; horizontal;
Or 5-6' medium-grained dolomite; common solution cavities along bedding; f: medium spaced N15E and N75W, some very wide

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Or 10-12' chert and dolomite; heavy Fe-oxides; solution cavities in dolomite; f: strongly fractured, but with inconsistent, chaotic orientations

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Og ~20' thin-bedded, fine-grained dolomite; bioherm at base; f: poorly developed, widely spaced N75W and N10E

225) Og approximately 150 yds upstream from 223) in creek bottom; bioherm; f: very closely spaced N20W and N80W; strong pattern

226) Og weathered; thin-bedded chert; heavy Fe-Oxides; f: medium spaced N30E and N30W

227) residuum\colluvium; no outcrops; Or chert and sandstone float

228) Og
thin-bedded dolomite; common solution cavities; N50W 3NE; f: medium spaced N85W and N20W

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stromatolitic chert bed in creek bottom; swirly white and gray color pattern; f: chaotic and numerous

229) residuum\colluvium; no outcrops; dominantly Or float

230) same as above

231) Og stromatolitic chert in creek bottom; no fractures

232) Og
Fe-stained residuum\colluvium

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medium- to thin-bedded dolomite; numerous solution cavities; f: medium spaced N75W

stromatolitic chert; no fractures

233) Og thin-bedded, medium-grained dolomite; horizontal; f: very closely spaced, closed N70E, N40E, and N15W

234) Og dolomite bioherm; poorly developed fractures

235) Or 10 ft-high, old road cut; thin-bedded chert; f: closely spaced N70E and N35W

236) residuum\colluvium; Or float

237) large float boulders of Or sandstone

12/4/94 Devils Elbow 7 ½' quadrangle

238) Og thin-bedded dolomite; N20W 4NE; f: closely spaced N25 E and subsidiary N55W

239) Or interbedded dolomite and chert, near Og contact; strong solution features; one small cave ~3 ft diameter opening, N10E direction; N80E 5°SE; f: poorly developed N15E and N55W

240) Og massive, medium-grained dolomite in creek bottom; f: closely spaced, closed N25-40E and N55W

241) Og thick-bedded, medium-grained dolomite; no apparent fractures

242) Og 4' ledge of thin-bedded dolomite; f: well developed, closely spaced N25-35E 75NW and N55W, some wide

243) Og massive, fine-grained dolomite; some solution cavities; f: poorly developed N25E and N55W

244) Og thin-bedded, fine- to medium-grained dolomite in creek bottom; f: medium spaced N35E and N40-45W

245) residuum\colluvium; no outcrops; Or and Og float

246) residuum\colluvium; Or sandstone and chert float

247) same as above

248) large boulders of Or massive sandstone

249) residuum\colluvium; no outcrops; Or sandstone and chert float

250) same as above

251) same as above

252) Or poor exposure of stromatolitic chert; no reliable data

253) large boulders of Or massive quartz sandstone

254) residuum of Or in road cut

255) same as above

256) residuum\colluvium; Or sandstone float

257) same as above

258) boulders of Or sandstone

Waynesville 7 ½' quadrangle

259) residuum\colluvium; no outcrops; Or float

260) residuum; Or sandstone boulders; no outcrops

261) residuum\colluvium; Or sandstone and chert float

Devils Elbow 7 ½' quadrangle

262) Or sandy, medium-grained dolomite; irregular white chert; f: closely spaced N75-80E, some wide, some closed

263) residuum\colluvium; Or sandstone float

264) Or similar to 262); basically horizontal; f: medium spaced N80E to E-W, most filled

265) Or 4-8 ft ledge of thin-bedded, fine-grained quartz

sandstone, orthoquartzite, and chert; horizontal; f: poorly developed N80E and N-S

266) residuum\colluvium; Or sandstone and chert float

267) Or thin-bedded, medium-grained sandy dolomite; bioturbated tubular structures; mudcracks; horizontal; f: poorly developed, medium spaced E-W

268) Or massive dolomite in creek bottom; horizontal; f: very widely spaced N80E

269) Or

3 ft thin-bedded, red-stained, fine-grained sandy dolomite

2.5-3 ft thin-bedded chert and sandy dolomite; f: poorly developed E-W

270) Or stromatolitic chert and orthoquartzite; druse-lined vugs common; f: closely spaced N70-80E and N35W

271) Or similar rock as above; f: closely spaced, wide N75W and N-S

272) Or stromatolitic chert and sandy dolomite; f: medium spaced N75E to E-W

273) residuum\colluvium; Or sandstone float

274) Or thin-bedded, fine-grained quartz sandstone; anticline, N60E axis, limbs dip 21° NW and 23° SE; f: closely spaced N-S and E-W

275) Or same rock as 274); N55E 17NW; f: closely spaced N-S and E-W

276) Or fine-grained quartz sandstone; anticline, N70E axis, limbs dip 29° NW and 10° SE (this limb is not fully exposed); f: medium spaced E-W and N-S

277) Or fine-grained quartz sandstone; anticline-syncline-sequence, axes N60E, limbs dip 20-25°, continues as 278)

278) Or fine-grained quartz sandstone; anticline, N70E axis, 22° NW and 25° SE; f: medium spaced E-W and N-S

279) Or sandy dolomite; horizontal; f: medium spaced N75E and N-S

280) Or fine-grained quartz sandstone; horizontal; f: closely spaced N75E and N-S

281) residuum; Or

282) Or/Og

sandy dolomite and chert

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thin-bedded, fine-grained dolomite; f: medium spaced N75E and N40W

12/5/94 Devils Elbow 7 ½' quadrangle

283) residuum\colluvium; Or sandstone and chert float

284) same as above

285) Or fine-grained quartz sandstone with white chert nodules as much as 1 ft in diameter; horizontal; f: closely spaced N10-25E and N65-70W, some wide

286) Or fine-grained quartz sandstone; N40W 15NE; f: medium spaced N20-25E and N65E

287) same as above

288) Or fine-grained sandstone and orthoquartzite; f: wide to medium spaced irregular pattern, E-W, N35W, and N70-75W

289) Or small rib of orthoquartzite in creek bottom; N80E 55°NW, paleokarst?; f: inconsistent and closed

290) Or 16-20 ft ledge of thin-bedded fine-grained quartz sandstone; cross bedded; ripple marks; horizontal; f: medium spaced, wide N10E and E-W

291) Or thin-bedded fine-grained dolomite and thin chert breccia beds; relatively heavy Fe-oxides; horizontal; f: closely spaced N-S

to N10E and N75W

292) Or similar rock as 291); f: closely spaced N10W and E-W

293) Or boulders of quartz sandstone close to in place, disturbed enough not to rely on data

294) large karst collapse structure in Or; strong red Fe-oxide staining; small outcrop of Or sandstone and orthoquartzite on south side with N20W 10NE attitude; f: closely spaced N20W and N70E

295) Or similar rock as 294); f: medium spaced N75E and N-S to N10W

296) small collapse structure (?)

297) Or stromatolitic chert; strongly shattered blasting(?); f: closely spaced N75E and N-S

298) Or quartz sandstone and orthoquartzite; cross bedded; ripple marks, mudcracks; broad syncline, N25E axis plunging 15° NE; f: closely spaced N-S and N65-75E

299) Or small outcrop of sandstone in road bottom; mudcracks; horizontal burrows; N20W 25SW; f: closely spaced N-S and N85W

300) Or small outcrop of sandstone at south end of pond-collapse structure?; contorted bedding dips into pond; f: very closely spaced N65-75W and N25-35E

301) residuum\colluvium; no outcrops; Or sandstone float

302) same as above; sandstone and chert float

303) same as above

304) residuum\colluvium Or float

305) colluvium; Or sandstone and chert float

306) same as above

307) boulders of Or sandstone and chert

308) Or massive quartz sandstone; many large sandstone float boulders in area; f: widely spaced N10E

309) Or blocky quartz sandstone; horizontal; f: medium spaced N10W-N10E and N75-80 W

310) Or thin-bedded quartz sandstone; horizontal; f: closely spaced N25E 65-90°NW, N20W, and N55W

311) colluvium\residuum; Or float

312) Og medium- to thin-bedded, fine-grained dolomite with minor chert; numerous solution cavities; horizontal; f: poorly developed N50-60E, N20E, and N40-45W

313) Og medium- to thin-bedded dolomite; numerous solution cavities, some a few ft deep; horizontal; f: closely spaced, solution widened N5-15E

314) Og 5-6 ft massive ledge of dolomite over 3-4 ft of breccia chert; f: medium to widely spaced N10-20E and lesser N55-60W

315) Og thin-bedded, fine-grained dolomite; dripping seepage; horizontal; blocky; f: medium spaced N85W to E-W and N10-15W

316) Og medium-bedded dolomite; numerous solution cavities; horizontal; f: closely spaced N15W, some mod. wide

317) Og 3 ft ledge about 30 ft uphill from 316); medium-bedded dolomite; numerous solution cavities; horizontal; f: medium spaced, solution widened N10-15W and N40E, some wide

318) Og 3 ft ledge about 20 ft uphill from 317); thin- to medium-bedded dolomite; common solution cavities; horizontal; f: medium spaced N50-55E and N10-20W

319) Or? 3 ft bed about 20 ft uphill from 318); very thin-bedded stromatolitic chert and dolomite; f: medium spaced N15W and N80E

320) Or 3 ft ledge of sandy dolomite; numerous solution cavities; f: medium spaced N25-30W and N85E, some healed

321) Or outcrop above power line; thin-bedded sandy dolomite

overlain by quartz sandstone; horizontal; some brecciated beds; f: medium spaced N15W and E-W, some solution widened chimneys at intersections

322) Or stromatolitic chert bed; horizontal; f: widely spaced E-W

323) Or sandy dolomite bed below 322); f: closely spaced N-S to N20E and N85E

324) residuum\colluvium; Or and Og float

325) same as above

326) Og old abandoned quarry; medium- to thin-bedded dolomite and intraformational chert breccia; some thin, white chert beds and nodules; horizontal;

west side- lower 15-20 ft bed; dolomite and chert breccia:
f: medium spaced N30W, N20W 44SW solution widened, N15W 74SW solution widened, N15W 75 SW solution widened, N45W 60SW solution widened, N40W 85SW solution widened

center- lower 15-20 ft bed;
f: widely to medium spaced N60W 86SW, N60W, N65E, N75W, N20E, N20E, N20E

east side- lower 15-20 bed;
f: medium-spaced N75W and N20E trends, some solution widening

327) Og thin-bedded, fine-grained dolomite; horizontal; f: medium spaced N20W and N65-70W

328) Og medium- to thin-bedded, fine- to medium-grained dolomite and intraformational breccia; horizontal; 8-10 ledges of dolomite each 3-6 ft high separated by breccia beds 1-3 ft thick; f: widely spaced N10-20W and N55-60E

329) Og same rock types as 328); f: closely spaced N80E and N10-20W

330) Og same rock types as above; ledge overhangs 3-4 ft deep; spring in south bank, few gal/m; f: medium spaced N20E, N70E, and N70W

331) Og medium-bedded, fine-grained dolomite; several solution cavities 1-2 ft in diameter; f: medium spaced N15E and E-W, some

solution widened

332) Og medium-grained dolomite; numerous solution cavities; N60W 3NE; f: closely spaced, solution widened N25E and N-S

333) residuum\colluvium; Or and Og float

334) colluvium\residuum; Or ss and chert float

335) Or sandy dolomite; numerous solution cavities; horizontal; f: very closely spaced N5W-N10E

336) residuum\colluvium; Or float of sandstone and stromatolitic chert

337) same as above

338) same as above

339) Or thin-bedded, sandy dolomite overlain by quartz sandstone; horizontal; f: medium spaced N-S to N25W and N75W

340) Or fine-grained quartz sandstone; N25E 14NW; f: very closely spaced N20W and N70E

341) Or fine-grained quartz sandstone; blocky; N40W 23NE; f: very closely spaced N60E 80-85 SE, N5-20W 80-90 SW

12/6/94 Devils Elbow 7 ½' quadrangle

342) Og medium-bedded, fine-grained dolomite; few small caves, one at least 4 ft deep; horizontal; f: medium to widely spaced N80E, N10-15E, and N60W

343) Og thick-bedded dolomite; numerous solution cavities; dripping seepage; f: very sparse and irregular

344) Og big bluffs of massive, thick-bedded dolomite; f: widely spaced N10E

345) Og bluff of thin-bedded, fine-grained dolomite; craggy surfaces; solution cavities common, but not abundant; several small wet-patch seeps; N80E 3-6NW; f: poorly developed to nonexistent,

N20-25E(?), E-W(?)

346) Og similar to 345)

347) Og upper portion of bluff; small caves; f: widely spaced N20-30E and N70-75W

348) colluvium\residuum; Og float

349) Og thin-bedded, fine- to medium-grained dolomite; N40E 3SE; f: medium spaced N15W and E-W to N80W

350) Og old abandoned quarry with ~35 ft face; thick- to thin-bedded dolomite with white chert horizon; numerous solution cavities esp. in thinner beds; horizontal; f: poorly developed, dominantly N10E

351) Og medium- to thin-bedded dolomite; numerous solution cavities; some small caves; f: medium spaced N25E, N40W, N65-70E

352) residuum\colluvium; no outcrops; Og(?) float

353) Og medium-bedded, fine-grained dolomite; slightly vuggy; horizontal; f: medium to closely spaced N30-35E and N75E, some solution widened

354) Og medium- to thin-bedded dolomite; thin beds erode to form overhangs 10-12 deep; horizontal; f: widely spaced N-S and N75E

355) Og medium- to thin-bedded dolomite; common solution cavities and ledge-caves; f: widely spaced N10-20E

356) Og medium-bedded dolomite; 5 ft overhangs; dripping seepage; horizontal; f: widely spaced N-S

357) residuum\colluvium; no outcrops

358) Og medium- to thin-bedded, fine-grained dolomite; dripping seepage; horizontal; f: medium spaced N25E and N30W

359) Og medium- to thin-bedded dolomite; dripping seepage; horizontal; f: widely spaced N25E

360) Og medium- to thin-bedded, medium-grained dolomite with thin beds of intraformational breccia; dripping seepage; horizontal; f: widely spaced N10E and N75W

361) Og thin-bedded, medium-grained dolomite; dripping seepage; f: widely spaced N15E and N20W

362) residuum\colluvium

363) spring feeding small stock pond; no outcrops

Big Piney 7 ½' quadrangle

364) residuum\colluvium; no outcrops; Og and minor Or float

365) same as above

366) same as above

367) Og medium-bedded, medium-grained dolomite; dripping seepage; horizontal; f: medium spaced N25E, N60W, and N5E

368) Og thin-bedded, medium-grained dolomite; dripping seepage; f: medium spaced N5-20W and E-W

369) Og medium- to thick-bedded, medium-grained dolomite; common solution cavities; small seeps; f: widely spaced N15W and N65W, solution widened

370) Og medium- to thin-bedded, medium-grained dolomite; common solution cavities; horizontal; f; wide to medium spaced N35-50W and N25E

371) Og thin-bedded, medium-grained dolomite with common white chert nodules and thin lenses; outcrop has shattered appearance; seepage line below road and just above river level; f: numerous, but no consistent orientations

372) Og thin-bedded dolomite; poor, rubblely outcrop; no reliable structural data

373) residuum\colluvium; no outcrops

374) same as above

375) same as above

376) same as above

377) same as above

378) small spring in residuum\colluvium; no outcrop

379) spring-fed pond; no outcrops

380) residuum\colluvium

381) same as above

382) same as above

383) same as above

384) Or fine-grained quartz sandstone; light-red color; N40W 7SW; f: widely spaced E-W and N10E

385) Or fine-grained quartz sandstone; E-W 10N; f: closely spaced, healed N-S to N30E

386) Og medium- to thin-bedded, medium-grained dolomite; 3 ft diameter, hollow chert nodules; horizontal; f: widely spaced N40-60 E

387) residuum\colluvium; no outcrops; Or and Og float

388) Og medium-bedded, fine-grained dolomite; horizontal; f: medium spaced N15E and N40W

389) Og same rock as 388); horizontal; f: medium spaced N15E and N60W

390) Ojc thin-bedded, fine-grained, well-sorted quartz sandstone; horizontal; f: medium spaced N15-25E and N55-65W

391) Ojc medium- to thin-bedded quartz sandstone and stromatolitic chert; f: medium spaced N15-25E and N30-40W

392) Ojc orthoquartzite and fine-grained, well-sorted quartz sandstone; horizontal; f: closely spaced N30E (horizontal striations and mullions ?), N-S, and N75W

393) Ojc thin-bedded, fine-grained sandstone and chert; basically horizontal; f: medium spaced N-S, N25E, and N55-60W

12/7/94 Devils Elbow 7 ½' quadrangle

394) Og white stromatolitic chert and red, Fe-stained cindery chert; rubblely outcrop; f: strongly shattered, trends at N35-40E, N40W, and N85W to E-W

395) Or fine-grained quartz sandstone; contorted bedding N10E 33SE to N45W 15NE; f: medium spaced E-W and N-S

Big Piney 7 ½' quadrangle

396) Or quartz sandstone; poor outcrop in road cut

397) Or fine-grained quartz sandstone; N10W 20NE; f: closely spaced N10W and N80E

398) Or fine-grained quartz sandstone; N30E 25NW; f: medium spaced N25W and N80W

399) Or massive quartz sandstone; horizontal; f: widely spaced N10-20E and N75W

400) Or quartz sandstone; monocline, horizontal to N35W 10°NE; f: widely spaced N60E, N10E, and N50W

401) Or fine-grained quartz sandstone; horizontal; f: medium spaced N50W, N25E, and N55E

402) large float boulders of Or sandstone

403) same as above

404) Or/Og
thin-bedded quartz sandstone; ripple marks; N15W 15NE; f: medium spaced N10W to N15E and N75-80W

medium-grained dolomite; N15W 5NE; f: medium spaced N15-20E and N80W
note: fractures in Or do not extent down into Og

405) Or/Og contact at about 950 ft

Devils Elbow 7 ½' quadrangle

406) Or huge boulders of quartz sandstone, close to in place, but disturbed enough to make structural data unreliable

407) residuum\colluvium; no outcrops; Or sandstone float

408) Og medium- to thin-bedded, fine-grained dolomite; horizontal; f: medium spaced N10E and N25W

409) spring saturated ground; no outcrops

410) Og medium-bedded, fine-grained dolomite; scattered solution cavities; N75E 5°NW; f: medium spaced N70E 70SE

411) Og thin-bedded, fine-grained dolomite with small nodules of white chert; common solution cavities; minor intraformational breccia; f: poorly developed N75W and N25E

412) residuum\colluvium; no outcrops

413) Og medium-bedded, fine-grained dolomite; horizontal; f: closely spaced N15E

414) Og medium-bedded, fine-grained dolomite; f: medium spaced N15-25E and N75-80W

415) residuum\colluvium; Or and Og float

Big Piney 7 ½' quadrangle

416) Og abandoned quarry; medium- to thin-bedded dolomite with thin white chert beds and nodules; numerous solution cavities; horizontal; f: closely spaced N40E and N45W

417) residuum\colluvium

418) Og thin-bedded dolomite and chert; numerous solution cavities; common Fe-oxides; karst features; horizontal; f: widely spaced N30E and N75W

419) Og thin- to thick-bedded, fine-grained dolomite several beds of strongly fractured chert and intraformational breccia; vuggy; numerous solution cavities, including small caves; horizontal; f: closely to medium spaced, well developed N45-50E and N60W

420) Og karst collapse structure

421) Og cave, 5 ft diameter opening, forked S20E and N75E direction for at least 15 ft; cave developed above a 4 ft-thick stromatolitic chert bed; f: medium spaced in roof of cave dominantly at N20W and N60E

422) Og karst collapse structure

423) Og thick-bedded dolomite with chert breccia horizons; numerous solution cavities; horizontal; f: closely spaced, well developed N40E, many solution widened to moderately wide

424) Og cave; 5 ft diameter opening, S40E direction; about 30 ft south of cave is a 20-25 ft diameter pipe-shaped opening that extends upward for 25-30 ft

425) Og karst collapse structure

426) Og thick- to thin-bedded, fine-grained dolomite with several chert breccia beds; common solution cavities; horizontal; f: poorly developed N70W and N20E

427) Og about 200 ft north of 426); similar rock; f: closely spaced N35W and N45E

428) Og thin-bedded dolomite overlain by thick-bedded dolomite; several solution cavities in thick beds; horizontal; f: poorly developed in thick beds N35-40W and N40E

429) Og thick-bedded dolomite with white chert; horizontal; f: widely spaced N70W and N20E

430) colluvium\residuum

431) Stone Mill Spring; many thousand gal/m; Og medium- to thin-bedded dolomite; small cave with 1.5-2 ft diameter opening about 20 ft above spring, S30W direction; f: medium spaced N25E and N45W

432) Og medium- to thin-bedded dolomite with ellipsoid-shaped white chert nodules; scattered solution cavities; f: closely spaced N30E and N50W

433) colluvium\residuum; Or sandstone float

434) same as above

435) same as above

436) residuum\colluvium; Or and Og float

437) same as above

438) Og spring, few hundred gal/m, flowing out of cave with 3 ft diameter opening, N80W direction; numerous solution cavities; f: medium spaced N5-15E and N60-70W

439) Og cave; opposite side of small hill from 438); 5 ft diameter opening; f: medium spaced N30W, N80E, N60W

440) Og cave; 5 ft diameter opening, branches into several narrow headings including N10E and N65W; numerous solution cavities; common secondary carbonate minerialization; N40E 4NW; f: closely spaced, but poorly developed N10E, N65-75W

441) Og thin- to medium-bedded dolomite with white chert; f: widely spaced N75W and N45E

442) Og thin- to medium-bedded dolomite with white chert nodules and lenses; horizontal; f: widely spaced, poorly developed N15-25W, N60E, and N45W

443) Og medium- to thin-bedded dolomite; horizontal; f: widely spaced N55E and N20-25W

444) Og medium-bedded, medium-grained dolomite; f: widely spaced N75W and N10E

445) Og thin-bedded dolomite; solution cavities common; horizontal; f: medium spaced N70-75W and N-S to N10E

446) Og medium-bedded dolomite with minor white chert; numerous solution cavities; minor seepage; horizontal; f: medium spaced N35W and N50E

447) Og medium- to thin-bedded, medium-grained dolomite; horizontal; f: medium spaced N30-35W and N60E

448) Og medium-bedded dolomite; considerable seepage; f: closely spaced, solution widened to moderately wide N-S to N10W and N75E

449) Og thick- to thin-bedded dolomite with minor white chert; common solution cavities; minor seepage; horizontal; f: poorly developed N20W, N15E, and N60W

450) Og medium- to thin-bedded, fine- to medium-grained dolomite with minor white chert; common solution cavities; horizontal; f: medium spaced N35-45E and N70-75W

451) Og thin-bedded, fine-grained dolomite with abundant white chert; secondary white carbonate mineralization; horizontal; f: west end of outcrop has closely spaced N10W and N75E that become wider spaced towards the east

452) Og rubblely outcrop of stromatolitic chert; abundant Fe-oxides; f: poorly developed N60E

453) Og thick-bedded, fine-grained dolomite; numerous solution cavities along bedding surfaces; f: medium spaced N25E and N30W, some solution widened

454) residuum\colluvium; no outcrops; Or sandstone float

455) Or thick-bedded, massive, fine- to medium-grained quartz sandstone; red color; f: medium spaced N70W and N-S

456) Or medium-bedded, massive sandstone overlying thin-bedded sandstone; broad anticlinal and synclinal rolls, axes approximately N60E; f: wide to medium spaced N15E, N20W, and N70W, gravity widened by road cut

457) Or small outcrop of quartz sandstone in road bottom; f: medium spaced N15E, N80E, and N40W

458) Or residuum in cut of old landfill

459) Or quartz sandstone and chert in road bottom; N25E 5-15NW; f: widely spaced N15-25E, N55-60E 75-80°NW, and N60W

460) residuum\colluvium; heavy Or sandstone and chert float

461) Og small outcrop of stromatolitic chert in road ditch; no reliable structural data

462) Or thick-bedded, massive quartz sandstone; horizontal; f: widely spaced N20-30E and N40W

463) Or quartz sandstone and chert; f: medium spaced N10E and N75W

464) residuum\colluvium; no outcrops; Or float

465) Og 5 ledges of fine-grained dolomite; horizontal; f: medium spaced N30E and N70-75W

466) colluvium\residuum; Or and Og float

467) same as above

468) same as above

469) Og medium-bedded, fine-grained dolomite; horizontal; f: medium spaced N15-20E and N65-70W

470) Or quartz sandstone, orthoquartzite, and chert; N70W 8NE; f: closely spaced and numerous, dominant trends N10-30E and N40-60W

471) Or massive quartz sandstone; horizontal; f: medium spaced N35-40W, N75W, and N15E

12/9/94 Big Piney 7 ½' quadrangle

472) Or small outcrop of quartz sandstone in road ditch; horizontal; f: closely spaced N5-15W and N80E, medium spaced N30E

473) Or massive quartz sandstone; f: widely spaced and wide N30E

474) Or medium- to coarse-grained sandstone with white chert granules and thin chert beds with spongy texture; oolitic; N80W 5SW; f: medium to closely spaced N-S, N40W, and N75W to E-W

475) Or karst collapse structure, 8-10 ft in diameter, minimum of 7 ft deep; boulders of Or quartz sandstone in walls

476) Or massive quartz sandstone; f: medium spaced N60W and N30E, partially healed

477) Or quartz sandstone; N30E 3°SE; f: medium spaced N30W, N50E, and N10W, some very wide

478) Or massive quartz sandstone; f: widely spaced very wide N60E and narrow N30W

479) Or small collapse structure about 10 ft in diameter and 4 ft deep; no outcrops; Or sandstone and chert float

480) Or thin-bedded quartz sandstone; E-W 5N; ; f: widely spaced N40E and N80E

481) colluvium\residuum; no outcrops

482) large boulders of Or quartz sandstone and small cobbles of chert

483) Or quartz sandstone; horizontal; f: medium spaced N-S to N20W and N70W

484) Or quartz sandstone; horizontal; f: medium spaced N30-40W

485) residuum\colluvium; float of large Or sandstone boulders

486) colluvium\residuum

487) residuum\colluvium; float boulders of Or sandstone

488) same as above

489) same as above

490) same as above

491) Or massive quartz sandstone; N40W 12NE; f: widely spaced N40E and N10W

492) Or massive quartz sandstone; ripples, asymmetric towards N30E; f: widely spaced N10-30E

493) Or orthoquartzite and chert; f: medium spaced N-S to N10E (some very wide due to gravity) and N40W

494) Or quartz sandstone and orthoquartzite; N65W 30SW; f: medium spaced N40E and N10W

495) Or quartz sandstone and orthoquartzite; f: poorly developed N65E and N75W

496) Og small outcrop in road ditch; stromatolitic chert; dolomite float uphill for 20 ft; no reliable structural data

497) Og dolomite and stromatolitic chert; horizontal; f: widely spaced N20E

498) Or massive quartz sandstone; variable attitudes, N-S 12W, N40W 10SW, horizontal; N30E 6SE; f: widely spaced N15E and N75E, and medium spaced N45W

499) Or quartz sandstone and orthoquartzite; tight asymmetrical anticlinal structure, N70W axis, limbs 10°NE and 34°SW; f: widely spaced N70E and N20W

500) Or quartz sandstone; anticlinal structure, axis ~N15E plunging SW, limbs 9°NW and 15°NE; closely spaced and numerous N10E 75NW, N45E, and N35W

501) Or/Og strongly contorted bedding in Or sandstone directly above horizontal Og dolomite

502) Or pinnacles of massive quartz sandstone

503) Og white stromatolitic chert; f: poorly developed N20E

504) Og thin-bedded dolomite overlying stromatolitic chert; common

solution cavities in dolomite; dripping seepage; horizontal; f: medium spaced N55W and N40E

505) Og stromatolitic chert; f: closely spaced localized and strongly developed N50W zone

506) Og thick-bedded, fine-grained dolomite with intraformational breccia; ledge-caves along breccia horizon; dripping seepage; horizontal; f: poorly developed N35E and N65W

507) Og dolomite in creek bottom; f: medium spaced N65-70W

508) residuum\colluvium; no outcrops; boulders of Or quartz sandstone

509) Og medium-bedded dolomite; numerous solution cavities; horizontal; f: medium spaced N75W and N15E

510) Og medium- to thin-bedded dolomite; horizontal; f: closely spaced N55W, N25E, and N75E

511) Og 5 ft ledge at creek level overlain by Or sandstone float, at or very near contact; horizontal; f: medium spaced N35W and N65E

512) Og 10 ft of thin-bedded dolomite overlying 10 ft of medium-bedded dolomite; common solution cavities; horizontal; f: medium spaced N50E

513) Og medium- to thin-bedded, fine-grained dolomite; numerous solution cavities, some as much as 3 ft in diameter; horizontal; f: medium spaced N20E, lesser widely spaced N60W

514) Og 40 ft bluff of massive, thick-bedded dolomite overlying strata at 513); numerous solution cavities; horizontal; f: upper portion has virtually no fractures, lower portion has medium spaced N20E and N60W

515) Og same horizon as 515); west end of outcrop; f: medium spaced N35E and N70W

516) Og thick-bedded dolomite; horizontal; f: medium spaced N35E and N75W

517) Og stromatolitic chert; f: poorly developed N35W and N70W

518) Or huge boulders of quartz sandstone; probably disturbed, but close to in place

519) Or orthoquartzite; f: widely spaced N5E

520) Or thick-bedded, massive sandstone and orthoquartzite overlying thin-bedded quartz sandstone; ripple marks, symmetrical N30W-S30E wave direction; f: medium spaced N70E and N15E

521) Og thick-bedded dolomite near Or contact; horizontal; f: medium spaced solution widened N45W and N5E to wide

522) Og medium-bedded, fine-grained dolomite; numerous solution cavities; horizontal; f: medium spaced N35-40E and N75W

523) Or massive quartz sandstone; f: widely spaced N75W and N25E

524) Or thin-bedded quartz sandstone; ripple marks, asymmetrical towards S40E; N45E 24°SE; f: closely spaced N-S and N70-75E

525) Or massive quartz sandstone; horizontal?; f: widely spaced N25E

526) Or **good section**; 10-15 ft of thin- to medium-bedded, well-indurated quartz sandstone overlying thin-bedded, heavily Fe-stained, very friable quartz sandstone and chert(carbonate leached ?); collapse structure on west end of outcrop; irregular anticlinal structure, plunging northward in indurated beds; N85W 25°NE, N45W 18°NE, N35W 21°NE; f: medium spaced N65E 75-90SW, N85E 90± 15°, and N25E 90±15°

527) Or massive quartz sandstone; E-W 14°S; f: closely spaced N15E and N50W 60NE

528) Or massive quartz sandstone; f: medium spaced N30W and N25E

12/10/94 Big Piney 7 ½' quadrangle

529) Og thin-bedded dolomite and chert; N-S 6°W; f: poorly developed N-S and N55-60E

530) Og thin-bedded dolomite and chert; horizontal; f: poorly developed N-S and N35W

531) Og medium-bedded, fine-grained dolomite; numerous solution cavities; horizontal; f: medium to widely spaced N-S to N10E and N60E, solution widened to wide

532) Og medium- to thin-bedded, medium-grained dolomite with minor chert; 25-30 ft collapse structure ?; horizontal; f: medium spaced solution widened to wide N15-20E 90±15°

533) Og medium-bedded, medium-grained dolomite with scattered white chert blebs; numerous solution cavities; horizontal; f: closely spaced N15E and N30-35W 90±25°

534) residuum\colluvium; Or and Og float

535) Og active quarry; west end face above 1st bench; thin-bedded, fine-grained dolomite with white chert; dripping seepage; horizontal; f: poorly developed N30-35W and N75W

536) 2nd bench; stromatolitic chert in floor; medium- to thin-bedded dolomite in face; f: poorly developed medium spaced N20-45W and N40E

537) east side of quarry; lowest face; similar rock as 535); horizontal; f: widely spaced N60E and N70W

538) 2nd bench face; f: widely spaced N60E and N10W

539) residuum\colluvium; Og float

540) Og large cave in bluff on east side of Big Piney River (didn't visit)

541) residuum\colluvium

542) Og rotten chert, strong Fe-oxide staining; druse-lined vugs; outcrop ? or residuum ?; f: widely spaced N30W ?

543) residuum\colluvium; Or sandstone and chert float

544) same as above

545) Or quartz sandstone; horizontal; f: medium spaced N45W, N40E, and N-S

546) Or quartz sandstone; horizontal; f: widely spaced N25E and N75E

547) Or quartz sandstone; horizontal; f: medium spaced N30E and N55W

548) Or quartz sandstone; horizontal; f: widely spaced N40W and N15E

549) residuum\colluvium; Or and Og float

550) residuum\colluvium; minor Or float

551) same as above

552) Or poor outcrop of sandstone in road bottom; f: medium to closely spaced N50E, N-S, and N20W

553) Og medium-bedded, medium-grained dolomite; common solution cavities; horizontal; f: medium spaced N70W and N15E, some solution widened

554) Og medium-bedded dolomite overlying stomatolitic chert in creek bottom; horizontal; f: medium spaced N30E and N55W

555) Og medium-bedded, medium-grained dolomite; horizontal; f: medium spaced N40-45W and N-S

556) Og medium- to thin-bedded dolomite; numerous solution cavities; horizontal; f: poorly developed N45W

557) Og thin-bedded dolomite overlain by stromatolitic chert; horizontal; f: poorly developed N-S and N75E

558) Og medium- to thin-bedded dolomite; horizontal; f: medium spaced N-S and N70W

559) Og thin-bedded dolomite with white chert lenses and nodules; bleached color; rubblely, fractured outcrop; f: closely spaced trends at N25E and N55W

560) Og horizontal;
thin-bedded dolomite; f: medium spaced N70W and N40E

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3 ft stromatolitic chert; no fractures

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medium-bedded, medium- to coarse-grained dolomite; f: closely spaced, solution widened to moderately wide N60E

561) Og thin-bedded dolomite; horizontal; f: medium spaced N-S, N10E, and N75E

562) Og thick-bedded dolomite overlain by stromatolitic chert; horizontal; f: closely spaced N30-35E and N45W

563) Og thick-bedded, massive dolomite; bluff former; cave-ledges at base; horizontal; f: widely spaced N40-45W and N25E

564) Og thick-bedded dolomite with irregular white chert; horizontal; f: medium spaced, solution widened to wide N45-50E and N75W

565) Og good exposure of upper Og; medium-grained dolomite; horizontal;
30-35ft massive dolomite; f: poorly developed N75E and N15W

20-25 ft covered interval

15-20 ft medium-bedded dolomite; f: widely spaced N35-40E and N60-70W

10-12 ft covered interval

12-15 ft medium-thin-bedded dolomite; f: medium spaced N45E and N50W

566) Og medium-bedded, medium-grained dolomite; horizontal; f: medium spaced N45E and N50W

567) Or small outcrop of massive quartz sandstone; no reliable structural data

568) Or thin-bedded quartz sandstone; N20W 5-20NE; f: closely

spaced N45E and N35-50W

569) Or quartz sandstone; blocky, rubblely outcrop; f: closely spaced N25E to N30W

570) Or quartz sandstone; variable attitudes N45W 33NE, N75W 19NE; f: medium spaced N10W and E-W

571) Og thick-bedded, medium-grained dolomite; horizontal; f: medium spaced N10-20W and N80W

572) Or blocky sandstone, poor outcrop

Og medium-bedded dolomite with minor chert; common solution cavities; Fe-stained; small 1 ft diameter cave, several feet deep; horizontal; f: medium spaced N15E, N40W?

573) Og thick-bedded, medium-grained dolomite; dripping seepage; horizontal; f: medium to widely spaced N10-15E and N55W

574) Og medium-bedded dolomite; horizontal; f: closely spaced, solution widened to wide N10W

575) Og medium-bedded dolomite and chert overlying massive thick-bedded dolomite; overhangs as much as 15 ft at contact; horizontal; f: poorly developed, widely spaced N25E

576) Og medium- to thin-bedded dolomite; horizontal; f: medium spaced N-S and N75W

577) Or quartz sandstone; N10W 12NE; f: widely spaced N35-40W

12/11/94 Big Piney 7 ½' quadrangle

578) Or quartz sandstone; symmetrical ripple marks, N30W to S30E wave motion (elongated N60E); N30W 18SW; f: widely spaced N-S and N60-80E

579) Or quartz sandstone; f: widely spaced N35W and N75E

580) Or quartz sandstone; gentle rolls in subhorizontal bedding; f: medium spaced N-S to N10E and N65W

581) Or quartz sandstone and orthoquartzite; horizontal; f: widely spaced irregular N-S to N35E

582) Or quartz sandstone; f: virtual complete compass rose of orientations N-S, N30E, N25W, N55W, N65E

583) Or quartz sandstone; subhorizontal; f: medium spaced N25-30E

584) Or massive, thick-bedded, fine-grained sandstone; f: widely spaced N10-20W

585) Or orthoquartzite; horizontal; f: medium spaced N75E, N75W, N10E

586) Or quartz sandstone; N75E 4NW; f: wide zone of no fractures laterally changes to zone of medium spaced N40E and N5W

587) Og thin-bedded, medium-grained dolomite; spring, few gal/m; horizontal; f: medium spaced N-S and N15W

588) Og stromatolitic chert in creek bottom; f: closely spaced N20-25W and N75-85 E

589) residuum\colluvium; abundant Or float

590) karst collapse structure

591) Og stromatolitic dolomite with minor chert; horizontal; f: medium spaced N75W and N10-15E

592) colluvium\residuum; numerous boulders of Or sandstone

593) Og 40 ft bluff; thick-bedded dolomite; 3 caves, upper has 6 ft diameter opening and minor seepage; horizontal; f: poorly developed, medium spaced N-S and N70-75W

594) Og medium-bedded dolomite below 593); f: well developed, closely spaced N55E and N10W

595) Og medium- to thin-bedded dolomite and stromatolitic chert; numerous solution cavities and small caves; horizontal; f: medium spaced N10W and N75E

596) Og medium-bedded, medium-grained dolomite; numerous solution cavities; f: medium spaced, solution widened to wide N15-25E

597) Og medium-grained dolomite about 30 ft above 596); Or sandstone lies directly above but does not crop out; numerous solution cavities; horizontal; f: poorly developed N5W and E-W

598) Og 2 ft stromatolitic chert overlain by 3 ft thin-bedded, medium-grained dolomite and chert overlain by 4 ft medium-grained dolomite and intraformational breccia with intense solution cavity development overlain by 3 ft dolomite with common solution cavities; horizontal; f: poorly developed N40E and N10W, none of which cut more than one horizon, ie. not through going

599) Og stromatolitic chert in creek bottom; f: medium to closely spaced N45W and N75W

600) Og medium-bedded, medium grained dolomite; numerous solution cavities; N60E 5NW; f: medium spaced N30E and N70W

601) Or quartz sandstone; subhorizontal; f: widely spaced N70E

602) Or quartz sandstone; subhorizontal; f: numerous and closely spaced, but inconsistent, possible trends-N45E, N-S, and N40W

603) Or quartz sandstone and orthoquartzite; horizontal; f: poorly developed, medium spaced N50W and N10E

604) Or/Og horizontal;
Or quartz sandstone; f: medium spaced N-S and N75W

Og massive bluff former; small caves; f: poorly developed N55W and N40E

Og medium-bedded dolomite; F; poorly developed N10E and N40W

605) Og stromatolitic dolomite bed in creek bottom

606) Og medium-bedded, medium-grained dolomite; few small solution cavities; horizontal; f: medium spaced N30E, N70-75W, and N80-85E

607) Or/Og horizontal; Or quartz sandstone float and questionable

outcrop overlying Og massive, bluff-former dolomite; f: poorly developed N10E and N55W

608) Or quartz sandstone; ripple marks asymmetrical towards the north; N30W 8NE; f: widely spaced N15W and N55W

609) Or quartz sandstone; N55E 19NW; f: medium spaced N10E and N75W

12/12/94 Waynesville 7 ½' quadrangle

610) Or sandy dolomite and chert; horizontal; f: widely spaced **through going** N50-65W 90±10°SW, mullion-like curves but no slickensides or offset of bedding

611) Or thin-bedded sandy dolomite; horizontal; f: medium to closely spaced N75W and N10W

612) Or thin- to very thin-bedded, sandy dolomite and chert; rough, craggy surfaces; some ledge-caves as much as 6 ft deep; horizontal; f: poorly developed and inconsistent

613) Or thin-bedded sandy dolomite; horizontal; f: poorly developed, irregular, and inconsistent

2/2/95 Roby 7 ½' quadrangle

614) Residuum, red, silty clay with subangular white bony chert and chalcedonic chert, sticky and slightly plastic, derived from Ojc

615) similar to above

616) Residuum, red, silty clay, boulders of white, slightly friable, case-hardened, fine-grained quartz sandstone; and cobbles of oolitic chert; derived from Ojc

617) Residuum, mixture of cherts in red, silty clay; dry bone, brecciated and drusy, and sandy varieties; derived from Ojc?

618) Residuum, brownish-yellow clay, sticky, mixture of chalcedonic, banded agate, and dry bone chert

619) Or float boulders of white sandy chert and sandstone overlying

5 ft ledge of white, fine-grained quartz sandstone and sandy chert overlying 6 ft ledge of medium-grained, slightly sandy dolomite containing some solution cavities; horizontal; f: medium spaced N10E and N80E

620) Or
10-12 ft, thin-bedded, drusy bedded chert

1.5-2.0 ft, thin-bedded, fine-grained quartz sandstone, mudcracks; N55W 3°NE

5-6 ft, thin-bedded, fine-grained ooltic chert; f: **through going** medium spaced N55W

20-25 ft, thin-bedded, fine- to medium-grained dolomite with irregular chert, chalcedonic and dense oolitic varieties

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1-2 ft stromatolitic chert

20+ ft, bluff-forming, massive, fine- to very fine-grained, well-sorted, quartz sandstone; horizontal; f: medium spaced N10-30E and N45-50W

621) residuum, brownish-yellow, sandy clay with a mixture of sandstone and chert fragments, chalcedonic, oolitic, and banded agate varieties, Or derived

622) Or 1-2 ft bedded sandstone overlying cherty residual material, fine grained and slightly friable; basically horizontal with small rolls; f: medium spaced N10E and N40W, some wide from gravity?

623) Or fine-grained, quartz sandstone, poor outcrop, variable attitudes, no reliable data

624) residuum/colluvium, boulders of sandstone float, Or or Ojc ?

625) Ojc Quarry Ledge 1 ft ledge of fine-grained dolomite in road bottom; horizontal; f: widely spaced E-W

626) Or massive, fine-grained quartz sandstone; basically horizontal; symmetrical ripples elongated N80E; overhang ledge 12 ft deep; f: medium spaced, healed N15E

627) Or thin-bedded, fine-grained dolomite, relatively massive outcrop with no fractures; dripping seepage

628) Or massive, fine-grained quartz sandstone; horizontal; f: medium spaced N-S to N10E, mostly healed, but some open and wide

629) Or thin-bedded, fine-grained sandstone; mudcracks; horizontal; symmetrical ripples elongated N40W; f: medium spaced N10W and N85W to E-W, some moderately wide

630) Or same horizon as 629); horizontal; f: widely spaced N20W

631) Or same horizon as 630); asymmetrical ripples towards N25E; f: medium spaced N25W

632) Or ooltic quartz sandstone; fine grained, well sorted, and rounded; f: medium spaced N20-35W

633) Or thin-bedded, fine-grained sandstone; horizontal; slabby with many ledges; f; widely spaced N10W, mostly healed, but some wide

634) Or same horizon as 633); f: medium spaced N30W, all open

635) Og fine-grained dolomite, craggy, common solution cavities; f: poorly developed N50-60W ?

636) Small cave, 6 ft high, 9 ft wide portal at N55W, tapers rapidly ~ 12 ft in to 2X2 ft; at Or-Og contact in dolomite-chert zone, thin bedded and somewhat brecciated, numerous solution cavities laterally at this horizon, sandstone above, dolomite below; no apparent fractures

637) Og massive, fine-grained dolomite, numerous solution cavities, very small seepage, horizontal; no fractures

638) Cave in basal Or sandstone; 10X20 ft portal, zig-zag N10W trend; thin-bedded, fine- to medium-grained sandstone in back, stromatolitic chert and bedded chert low in walls, narrows and pinches about 60 ft in; f: medium spaced healed N-S to N10W in back, dripping: numerous sandstone slabs; cave appears to have initial developed along lower dolomite/chert beds and subsequently added height by slabbing sandstone blocks

639) Or thin-bedded, quartz sandstone; horizontal; f: widely spaced N10-20W

640) Og thin- to medium-bedded, fine-grained dolomite, craggy; horizontal; no fractures

641) Or/Og contact
Or thin-bedded, fine-grained quartz sandstone; f: widely spaced N20W

Og fine-grained dolomite, numerous solution cavities, several seeps; horizontal; f: poorly developed N20-30W

642) Or thin-bedded, fine-grained quartz sandstone; f: widely spaced N15-20W and subordinate N80W to E-W

643) residuum, fine-grained sandstone and banded chert float, Ojc?

644) Ojc thin- to very thin-bedded, fine-grained dolomite, buff-gray color, irregular white chert, minor drusy-pitted `cotton rock', rare mudcracks; f: closely spaced, healed N-S

2/4/95 Waynesville 7 ½' quadrangle

645) residuum red, sandy clay, Or float, dominantly chert and dolomite, minor sandstone

646) Open collapse structure, ~20 ft in diameter vertical entrance into cave system; see Missouri Speleologic Club's map; collar consists of rotten, strongly leached Or

647) Or small sandstone outcrop in road bottom; no reliable data

648) Og fine-grained dolomite, small outcrop; horizontal; no fractures

649) Residuum/colluvium float of Or sandstone and chert

650) Same as above

651) Og medium-bedded, fine- to medium-grained dolomite; horizontal; f: medium spaced N15-20E and N80E

652) Og medium-bedded, fine-grained dolomite; f: closely spaced N50-55E, slightly solution widened

653) Og medium-bedded, fine-to medium-grained dolomite; horizontal; f: medium to closely spaced N50E and N75W

654) Small caves with ledge overhangs in Og

655) Og medium-bedded, medium-grained dolomite, several solution cavities, minor chert; horizontal; f: closely spaced N15-25E, medium spaced N55W

656) Og medium- to very thin-bedded, fine- to medium-grained dolomite, 1 ft bed of brecciated, white chert low in outcrop; horizontal; f: closely spaced N15-20E, some solution widened

657) Og relatively massive, medium-grained dolomite; f: widely spaced N65W and N35E

658) Og fine-grained dolomite; f: closely spaced N35-40E, strong solution widening

659) Og fine-grained dolomite; horizontal; f: closely spaced N40-50E, strong solution widening

660) Og fine-grained dolomite; horizontal; f: medium spaced N15-20E and N75W

661) Residuum/colluvium float of Or sandstone and chert

662) Og thin-bedded, fine-grained dolomite; horizontal; f: wide to medium spaced N-S and N80W

663) Og medium-bedded, medium-grained dolomite; horizontal; f: medium spaced N30W and N50-55E

664) Og
3 ft ledge of medium-bedded, medium-grained dolomite; horizontal; f: widely spaced N25-30E

10-12 ft covered interval

12-15 ft thin-bedded, fine-grained dolomite; horizontal; f:

poorly developed and irregular

665) Og thin- to medium-bedded, medium- to fine-grained dolomite; horizontal; small seeps; f: poorly developed and irregular

666) Or/Og
Or poorly cropping out sandstone, abundant boulder float

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break in slope

Og massive, medium-grained dolomite, bluff former, numerous solution cavities; horizontal; f: poorly developed N75W and N15-25E

667) Og medium-grained dolomite and bedded chert (4-6 in. thick); N80E 3-5°; f: poorly developed N30E

668) Og thin-bedded, medium-grained dolomite and stromatolitic chert; horizontal; f: numerous, discontinuous and inconsistent trends

669) Og stromatolitic chert; no fractures

670) Og 8 ft ledge, medium-grained dolomite; f: medium spaced N15-20E, solution widened

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3 ft stromatolitic chert; f: numerous, but inconsistent trends

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6 ft thin-bedded, fine-grained dolomite and chert; f: healed N15E and N60E

671) Og stromatolitic dolomite; f: numerous, but most are healed, locally strongly developed N30E trend, elsewhere circular

672) Og medium-bedded, medium-grained, pitted dolomite; horizontal; f: wide to medium spaced N5-20E, weakly solution widened

673) Og thin-bedded, fine- to medium-bedded dolomite; horizontal; f: closely spaced N15E

674) Og thin-bedded dolomite and chert overlying stromatolitic chert and dolomite; f: in upper beds closely spaced N20-30E, none

in lower beds

675) Og horizontal
6 ft thin-bedded chert and dolomite

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12 ft medium-bedded dolomite and chert

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6 ft stromatolitic chert
f: poorly developed in all beds, no through going or consistent trends

676) Og light-brown to white and gray dolomite and bedded chert; strong limonite and hematite stains locally; horizontal; f: numerous, but largely discontinuous, widely spaced N75E in some beds

677) Og medium- to thin-bedded, medium-grained dolomite; horizontal; f: closely spaced N60E, N80E to N80W, and N30E

678) Og stromatolitic chert; f: widely to medium spaced N-S to N20E

679) Or small outcrop, quartz sandstone over fine-grained dolomite; f: closely spaced N60E in Or; none in Og

680) collapse structure in Or

681) residuum, red, sandy clay; Or sandstone and chert boulders

682) Og massive, fine- to medium-grained dolomite, minor pitting; boulders of Or sandstone directly above; horizontal; no fractures

683) Og thin-bedded dolomite, strong terra rosa development; f: closely spaced, solution widened N30E and medium spaced N30W

684) Og fine- to medium-grained dolomite and chert, numerous solution cavities; horizontal; f: medium spaced N20-40W

685) Og massive. bluff-forming, medium-grained dolomite; horizontal; f: poorly developed and inconsistent

686) Og thin-bedded dolomite and chert, numerous solution cavities; horizontal; f: closely spaced N-S to N20W

687) Og thin-bedded, fine-grained dolomite; horizontal; f: poorly developed N-S to N30W

688) Og medium-grained dolomite, small outcrop in road ditch; f: one wide N30W, closely spaced N20E

689) Og medium-grained dolomite, small outcrop in road ditch, pitted surface; horizontal; no reliable fracture data

690) Residuum/colluvium Or and Og float

691) Residuum boulders of Or sandstone

692) Og rubblely outcrop of medium-grained dolomite, strong terra rosa development; no reliable structural data

693) Og small outcrop of stromatolitic chert

694) Og medium-bedded dolomite and chert; f: widely spaced N20-30E and N30W

695) residuum/colluvium red, sandy clay; sandstone, chert, and dolomite float

696) Residuum/colluvium Og chert float

697) Og stromatolitic dolomite and chert; f: very numerous, but inconsistent trends

698) Og medium-bedded dolomite and chert; horizontal; f: wide to medium spaced N20-30E and N75W

699) Og old quarry; medium- to thin-bedded, medium-grained dolomite, sparse white chert lenses; f: medium spaced N75W and N25E

Bloodland 7 ½' quadrangle

700) Residuum red, sandy clay and sandstone float, derived from Or

701) Ojc fine-grained quartz sandstone, mudcracks; N20E 6-10°NW; f: closely spaced N80W and N60E

2/5/95 Waynesville 7 ½' quadrangle

702) Residuum Or orthoquartzite, quartz sandstone, and chert float; red, sandy clay

703) Or very thin- to thin-bedded, platy, fine-grained sandy dolomite; horizontal; f: widely spaced N60-65E

704) Or stromatolitic chert and sandy dolomite; f: closely spaced N65-70E and widely spaced N15E

705) Og medium- to thin-bedded, medium-grained dolomite; several solution cavities; N40W 4°NE; f: wide to medium spaced N60E, some solution widened, and widely spaced N20W

706) Og medium-grained, cherty dolomite; horizontal; F; poorly developed and irregular, possible N60W, N30W, and N15E trends

707) Og stromatolitic chert, craggy; common Fe-ox stains; f: widely spaced N-S to N10E

708) Og medium-grained dolomite; f: closely spaced N60E, widely spaced N40W

709) Og 40 ft bluff; thick- to medium-bedded, medium- to coarse-grained dolomite; minor chert; several dripping seeps; horizontal; common solution cavities; f: widely spaced N40-50E and N15W

710) Og thick- to medium-bedded, medium-grained dolomite; numerous solution cavities and small caves; horizontal; f: well developed, close to medium spaced N40W and 50E

711) Og beds about 30 ft above 710) medium-grained dolomite; numerous small caves; f: medium spaced N20W solution widened

712) Og ~150 south of 710); medium-bedded, medium-grained dolomite; horizontal; f: zone of well developed **through going** (fractures cut lower 20 ft of beds), medium-spaced N60E and N35-40W, solution widened to moderately wide

713) Og beds ~30 ft above 712); numerous solution cavities; horizontal; no fractures

714) Og ~150 ft south of 713); thick-bedded, medium-grained dolomite, bluff former; numerous small (2 ft diameter) caves and

other solution features; karst collapse areas?; horizontal; virtually no fractures

715) Og ~150 ft south of 714); medium- to coarse-grained dolomite and stromatolitic chert; horizontal; f: zone of closely spaced N10E and N50E solution widened, restricted to beds in lower 10-12 ft of outcrop

716) Og thick-bedded, massive, bull-colored dolomite and chert; numerous solution cavities; horizontal; f: poorly developed with inconsistent trends

717) Og 20 ft of medium-grained dolomite with intercalated 5 ft bed of stromatolitic chert; N-S 4°W; f: medium spaced N55E and N40W below chert only

718) Og same horizon as 717); horizontal; f: medium spaced N60-70E, largely healed

719) Spring feeds small stock pond, no outcrop

720) Og
6-8 ft medium-bedded, fine-grained dolomite; horizontal;, f: medium spaced N60-80E

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10 ft, thin-bedded, fine-grained dolomite, white chert lenses and beds 3-6 in. thick; small seeps; no fractures

721) Og
20-25 ft, medium- to thick-bedded dolomite and chert; N30W 2°NE; f: widely spaced N60E and N40W, somewhat inconsistent

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12-15 ft, thin-bedded, fine-grained dolomite and bedded chert; f: very poorly developed and inconsistent

722) Small Spring, few gals/min

723) Og
25-30 ft, massive, medium-grained dolomite; several small caves with 3-4 ft diameter portals; horizontal; f: very widely spaced and poorly developed N25E and N70W

12-15 ft, thin-bedded dolomite and chert; f: poorly developed

N25-30E and N70W

724) Og relatively massive, medium-grained dolomite; horizontal; f: widely spaced N20-25E

725) Og pinnacle outcrops of craggy, medium-grained dolomite; common solution features; f: widely spaced N60W

726) Og spring, feeds small stock pond; f: medium spaced N60W

2/6/95 Waynesville 7 ½' quadrangle

727) Og medium-grained dolomite, craggy; 3 ft diameter cave; f: medium spaced N40-50W

728) Residuum/colluvium float of Or sandstone and Fe-stained chert

729) similar to above, boulders of Or sandstone close to being in place, no reliable data

730) Spring few hundred gals/min; no outcrop

731) Og thin-bedded, fine-grained dolomite; several solution cavities; horizontal; f: closely spaced, well developed, **through going** (cut entire outcrop) N35E and N60W, some solution widened

732) Og thin-bedded dolomite and chert; horizontal; f: widely spaced N35E

733) Og old railroad cut; thick-bedded, medium- to fine-grained dolomite overlain by white stromatolitic chert; abundant solution cavities; strong Fe-ox stains; horizontal; f: medium spaced N25-30E

734) cut similar to that in 733) on opposite side of draw

735) Og thin-bedded, fine-grained dolomite; minor white chert; very minor seepage; horizontal; f: poorly developed E-W

736) Og fine-grained dolomite, 5 ft of thick bedded overlain by 3 ft of thin bedded; horizontal; f: widely spaced N60-80E

737) Collapse structure approximately 100 ft in diameter

738) Og fine- to medium-grained dolomite; abundant solution cavities; horizontal; f: closely spaced N60E and N70W solution widened

739) Og thin-bedded, fine-grained dolomite; common solution cavities; horizontal; f: medium spaced N70W solution widened

740) Og medium-bedded, medium-grained dolomite; abundant solution cavities; horizontal; f: well developed, medium spaced, **through going** N35E and N70W, mild solution widening

741) Og thin-bedded, medium-grained dolomite, very minor white chert; horizontal; f: medium spaced N-S and N80E, some solution widened

742) Og fine-grained dolomite overlain by stromatolitic chert and chert (Or?); numerous solution cavities in lower beds; horizontal; f: medium spaced N-S to N10W, solution widened

743) Og medium-bedded, medium-grained dolomite; very strong solution cavities development; f: closely spaced N-S to N10E, solution widened

744) Quaternary terrace in upper reach of drainage; 5-6 ft above present level

745) residuum/colluvium strong erosion from pond spillway has created a 10-12 ft deep gully

746) residuum/colluvium sandstone, chert, and dolomite float

747) Og thin- to medium-bedded, medium-grained dolomite, slightly vuggy; common white chert nodules; horizontal; f: medium spaced N15-25E, solution widened?

748) Og stromatolitic chert overlain by fine-grained dolomite; f: in dolomite, poorly developed N15-20E

749) Og medium-bedded, medium-grained dolomite overlain by stromatolitic chert; horizontal; f: widely spaced N-S to N20E in both, N50W in dolomite

750) residuum/colluvium boulder float of stromatolitic chert

751) residuum/colluvium boulders of Og dolomite, close to being in place

752) Og bedded chert breccia; f: poorly developed and discontinuous N10E and N70-75E

753) Quaternary terrace, 5-6 ft above present day

754) Og stromatolitic chert in creek bottom and banks; small spring in Quaternary alluvium just above; no fractures

755) Og stromatolitic chert in creek bottom; f: widely spaced N70W

756) Og bedded chert breccia; horizontal; f: widely spaced, **through going** N65W and N25E

757) residuum/colluvium

758) Og thick-bedded, medium-grained dolomite and chert; numerous solution cavities; horizontal; f: closely spaced N35E, solution widened

759) Og stromatolitic chert and dolomite in creek bottom; strong Fe-ox staining

760) Og stromatolitic chert overlain by 5-6 ft of medium-grained dolomite containing abundant solution cavities; N25E 3-4°NW; f: closely spaced N70-75W and N15E, solution widened

761) Og stromatolitic chert; f: well developed, very closely spaced, healed N70W and N-S

762) Og medium-bedded, medium-grained dolomite; horizontal; f: medium to closely spaced N15-20E and N60W

763) residuum/colluvium chert float

764) Og medium-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: medium spaced N10E and N80E

765) Or small outcrop of fine-grained, quartz sandstone in road bottom; no reliable data

766) small spring; few gals/min

767) residuum/colluvium; boulders of Or sandstone and stromatolitic chert

768) similar to above

769) similar to above

770) similar to above

771) residuum/colluvium float of chert, sandstone, and orthoquartzite

772) residuum/colluvium soil development, loess?

773) two karst collapse structures, spring from structures feeds small creek several hundred gals/min

2/8/95 Waynesville 7 ½' quadrangle

774) Or massive, fine-grained quartz sandstone; small outcrop in road ditch; f: closely spaced N15W and N60-70W

775) Og medium-bedded, fine-grained dolomite; horizontal; f: closely spaced N15-30W and N45E, solution widened

776) Og medium- to thin-bedded, fine-grained dolomite; very minor chert; horizontal; f: widely spaced, **through going** N55-60W

777) Og medium-bedded, fine-grained dolomite; no chert; horizontal; f: medium spaced N35E and 60-65W, solution widened

778) Og medium- to thin-bedded, fine-grained dolomite; horizontal; f: medium spaced N60W

779) Og medium-bedded, fine-grained dolomite; no chert; horizontal; f: medium spaced N15E and N55-60W

780) Og 10-12 ft, thin-bedded chert and chert breccia; f: very poorly to nonexistent

781) Og medium-bedded, fine-grained dolomite overlying 780);

strong solution etching; f: medium spaced, wide N-S to N15E, solution widened

782) Og medium-bedded, fine-grained dolomite overlying bedded chert horizon; abundant solution cavities in dolomite; f: medium to closely spaced N15-20E and N55-60W

783) Og fine-grained dolomite; no chert; numerous solution cavities; f: closely spaced N30-45E, solution widened

784) Og 6-12 in. of bedded white chert overlain by medium-grained dolomite; horizontal; f: in dolomite, closely spaced N25-30E and N55-60W

785) Og medium-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: closely spaced N35E, solution widened

786) Og 3 ft white, bedded chert breccia

787) colluvium no outcrops; float boulders of Og dolomite, Or sandstone, and white chert

788) Og thin-bedded, fine-grained dolomite and white chert; horizontal; f: widely spaced N35E

789) Og medium-bedded, fine-grained dolomite; sparse chert; horizontal; f: medium spaced N60W and N25-30E

790) Og medium-bedded, fine-grained dolomite; no chert; horizontal; f: medium to closely spaced N35-40E and N55-60W, mild solution widening

791) Og thin-bedded, fine-grained dolomite; horizontal; f: poorly developed, widely spaced N20E

792) Og medium-bedded, fine- to medium-grained dolomite; minor white chert lenses; horizontal; f: medium spaced N60W, mild solution widening

793) Og medium- to thin-bedded, fine- to medium-grained dolomite; horizontal; f: medium spaced N60E and widely spaced N75-80W

794) Og medium- to thin-bedded dolomite and chert; horizontal; f:

widely spaced N15E

795) Og medium- to thin-bedded, fine-grained dolomite; horizontal; f: medium to closely spaced N25-35E

796) Og medium-bedded dolomite; minor chert; abundant solution cavities; horizontal; f: close to medium spaced N70E, solution widened

797) Og medium-bedded, medium-grained dolomite; abundant solution cavities; horizontal; f: closely spaced N-S, N35E, and N80E

798) Og thin-bedded, fine-grained dolomite; horizontal; f: widely spaced N35E

799) Og thin- to medium-bedded, fine-grained dolomite; minor chert; horizontal; f: widely spaced N35E

800) Og medium-bedded dolomite; numerous solution cavities; f: medium spaced N35E

801) Og thin- to medium-bedded, fine-grained dolomite; irregular chert lenses; horizontal; f: poorly developed, widely spaced N20E and N70E

802) Og 25 ft, thin- to medium-bedded, fine- to medium-grained dolomite overlain by 5 ft of stromatolitic chert; horizontal; f: medium spaced N55-60W and N35-40E

803) Og ragged outcrop of dolomite and chert; f: poorly developed N20-30E and N60W

804) Og interbedded stromatolitic chert and thin-bedded, medium-grained dolomite; horizontal; f: medium to closely spaced N20-30E in dolomite, mild solution widening

805) Og medium-bedded, medium-grained dolomite; horizontal; f: wide to medium spaced N15-30W and N80W

806) Og thin-bedded, fine-grained dolomite and stromatolitic chert and dolomite; f: poorly developed and inconsistent

807) Og medium-bedded dolomite; minor chert; horizontal; f: poorly

developed N25-30E and N15W

808) Og stromatolitic chert; f: irregular

809) Og stromatolitic chert and thin-bedded dolomite; rotten rock, moderate limonite stains; f: irregular

810) Og
thin-bedded, medium-grained dolomite and chert; abundant solution cavities; horizontal; f: medium spaced N25-30E and N80W

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4 ft stromatolitic chert; f: poorly developed E-W

811) colluvium/residuum float totally Or sandstone (many boulders) and white, banded chert

812) similar to above

813) Og stromatolitic chert grudge; strongly leached; abundant Fe-ox; no reliable data

814) colluvium/residuum dominantly Or sandstone float

815) Og fine-grained dolomite and stromatolitic chert; minor solution features; f: poorly developed N70W

816) Og medium-grained dolomite and bedded chert breccia; numerous solution cavities; horizontal; f: widely spaced N55-70W

817) Og fine-grained dolomite; f: closely spaced N20E

818) Og fine- to medium-grained dolomite; abundant solution features; horizontal; f: closely spaced N35E, solution widened

819) Og thin- to medium-bedded, medium-grained dolomite; white chert lenses and nodules; some solution features low in outcrop; f: medium to closely spaced N45E and N80W

820) Og thin-bedded dolomite and bedded chert breccia; horizontal; f: poorly developed N30W and N55-60E

821) residuum red, sandy clay; float of Or sandstone and chert

822) similar to above

823) similar to above; small boulders of Or sandstone

824) similar to above

825) residuum yellowish-brown clay with white chert fragments (oolitic and porcelaneous), red sandstone, and orthoquartzite

826) similar to above

827) similar to above

828) similar to above

829) Or fine-grained, quartz sandstone and sandy dolomite; no reliable structural data

2/9/95 Waynesville 7 ½' quadrangle

830) residuum yellowish-brown, sandy clay containing fragments of chert (some oolitic), sandstone, and orthoquartzite

831) residuum >15 ft, red, sandy clay; abundant sandstone float

832) Og thin-bedded, fine-grained dolomite and minor chert; stromatolitic chert bed at base; dripping seeps; yellow-brown Fe-stains above stromatolitic chert; f: medium spaced, irregular N30W and N60W

833) Og stromatolitic chert and dolomite, and lesser thin-bedded dolomite; large 3 ft diameter heads with 5-6 in. rims of chert and dolomite centers; minor seepage; f: closely spaced N60E

834) Og medium- to thin-bedded, fine-grained dolomite overlying stromatolitic horizon; numerous solution cavities and one small cave 4 ft wide and 1 ft high; horizontal; f: medium spaced N30-35W and N55-60W

835) Og fine-grained dolomite; abundant irregular chert; Fe-ox stains; small seeps; f: wide to medium spaced N30W and N80W

836) residuum/colluvium sandstone, dolomite, and chert float

837) Quaternary terrace; graded 3-7 ft above present level

838) Og stromatolitic chert; strong Fe-ox; wavy surface; f: numerous, but disorganized

839) residuum/colluvium abundant sandstone float and lesser dolomite

840) Quaternary terrace; 8-10 ft above present alluvium

841) Og stromatolitic chert and dolomite in creek bottom; strongly pitted; f: irregular, poorly developed N40E and E-W

842) Og thin to medium-bedded, medium-grained dolomite and intraformation chert breccia; numerous solution cavities and small caves with 3-4 ft diameter portals and 6-7 ft deep; several small seeps; horizontal; f: widely spaced N10E

843) Or fine-grained, quartz sandstone; strong hematite staining; N-S 40°W; f: inconsistant

844) Or thin-bedded, fine-grained quartz sandstone; asymmetrical anticlinal structure, N10W axis-32°SW and 5°NE limbs; progresses southwest into N35E 40°NW attitude; f: closely spaced N40W 90±20°

845) residuum/colluvium Or sandstone and chert float

846) similar to above

847) Og medium-bedded, medium-grained dolomite; horizontal; f: widely spaced N5W and N35E

848) Og medium- to thin-bedded, medium-grained dolomite; horizontal; f: widely spaced N35E

3/14/95 Waynesville 7 ½' quadrangle

849) Og medium-bedded, medium-grained dolomite, irregular white chert, 3-4 ft ledge overlying stromatolitic chert, overlain by 15-20 ft of residuum; horizontal; f: medium to closely spaced N35-40E, and N65-70W solution widened, subordinate N19W

850) Og poor outcrop of medium- to coarse-grained dolomite with

irregular chert nodules; f: one at N70W

851) Og thick-bedded, fine- to medium-bedded dolomite, minor white stromatolitic chert, numerous solution cavities, horizontal; f: medium-spaced N35W, N55W, N60-65W solution widened

852) Og stromatolitic chert and thin-bedded dolomite; f: **through going?** widely spaced N35-55W and N70-80E

853) Og rubblely outcrop, abundant Fe-oxides terra rosa, karst structure 15-20 ft across

854) Og medium-bedded, coarse-grained dolomite, rare solution cavities, horizontal; f: medium- to widely spaced N35-40E, N60W

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medium-bedded stromatolitic chert; f: N35E healed

855) Og thick- to medium-bedded, medium- to coarse-grained dolomite, 5-6 in. chert beds, 3 ft intraformation breccia horizon, numerous solution cavities and small caves concentrated in breccia; small seeps; horizontal; f: widely spaced N70W and N35E, moderate solution widening

856) Og same horizon as 855), water issuing from gravels at fork in drainage, flows over bedrock for few hundred ft, then goes back into gravels below 855); f: medium-spaced N35-40E and N60-65W solution widened

857) Og thin-bedded, coarse-grained dolomite and stromatolitic dolomite and chert; heavy seepage; f: poorly developed to nonexistent

858) Og site of Old Indian Lead Mine on topographic map- mine does not exist at this location, no evidence of digging or dump; bouldery outcrop of very thin-bedded stromatolitic chert, abundant Or sandstone float directly overlying; no reliable structural data

859) Og medium-grained dolomite, 2 ft thick bed with 6 ft overhang ledge; f: close- to widely spaced N21E and N40W

860) Og thick- to medium-bedded, fine-grained dolomite and chert, somewhat porous, rare druse-lined vugs 1/16 in., fragments of gray

chert; dry waterfall; horizontal; f: wide- to medium-spaced N70W and N21E

861) Og stromatolitic chert, thin bedded; f: wide- to medium-spaced N35E and N40W

862) Og overlies 861), medium- to thick-bedded, coarse-grained dolomite and intraformational breccia; minor seepage from breccia; common solution cavities; horizontal; f: poorly developed to nonexistent

863) Og rotten, oxidized outcrop of coarse-grained dolomite, heavy Fe oxides terra rosa, karst collapse structure, partially filled with blocks of Or sandstone

864) Quaternary terrace, ~3 ft above present

865) old landslide ~100 ft across, 2.5 ft-diameter trees growing from material

866) Og small outcrop of chert breccia; week seepage; no reliable structural data

867) Og thick- to medium-bedded, medium-grained dolomite; numerous solution cavities, minor seepage; f: medium-spaced N10-20E and N40W

868) Og coarse- to medium-grained dolomite in creek bottom; heavy seepage feeding modest stream; no reliable structural data

869) Quaternary terrace on meander nose, ~15 ft above present

870) Og medium-bedded, coarse- to medium-grained dolomite; dripping seepage-spring area, creek is dry upstream; horizontal; f: closely spaced N40W and N35E

871) old rock-line cistern

872) Og thick-bedded, coarse-grained dolomite; horizontal; numerous solution cavities; f: widely spaced N-S solution widened to moderately wide

873) Og thick-bedded, coarse-grained dolomite; horizontal; numerous solution cavities; f: poorly developed, widely spaced N15E

874) Or massive fine- to medium-grained, poorly sorted quartz sandstone; bouldery outcrop, no reliable structural data

875) karst collapse structure ~20 ft in diameter

876) Or small outcrop of thin-bedded quartz sandstone; no reliable structural data

877) residuum\colluvium

878) small spring? standing water over 25 ft interval

879) Or fine- to medium-grained quartz sandstone; N20E 5°NW; f: closely spaced N10E and N35W, and medium to widely spaced E-W, all are wide
Or/Og contact at ~1000 ft

880) karst collapse structure, ~15 ft in diameter, 6 ft deep, closed; above 863)

881) residuum red, slightly sanded, mildly plastic clay; float of Or sandstone, oolitic chert, banded chert

882) residuum Or sandstone float

883) residuum yellow-brown, slightly plastic clay; float of Or sandstone and chalcedonic to banded chert

Bloodland 7 ½' quadrangle

884) residuum float off Or fine- to medium-grained quartz sandstone, banded to chalcedonic and oolitic chert

885) spring? water flowing across road, possible karst collapse

886) small karst collapse structure filled with water

887) karst collapse structure with small pond

888) residuum yellow-brown clay, Or sandstone and chert float

889) Or small outcrop in road ditch, oolitic chert and quartz sandstone, heavy Fe oxides; f: two at N45W and one at N23W

890) Or small outcrop of brownish buff, poorly sorted quartz sandstone; f: one at N55W

891) Or very thin-bedded, coarse- to fine-grained quartz sandstone, stromatolitic chert, and medium-grained dolomite; mudcracks; f: poorly developed N60W and N44E

892) residuum pseudo-outcrop of Or sandstone, heavy Fe oxides

893) Or outcrop in ditches and road bottom of ooltic chert breccia, druse-lined vugs; no reliable structural data

894) Or fine- to medium-grained quartz sandstone; symmetrical ripples elongated N10W (long and dominant) and N70E (rill-like, shorter, and subordinate); f: poorly developed N20-40E and N50-70W

895) same rock as above; N40E 8-10°SW; f: one at N20W

896) small spring, few gal/m; Or chert; f: closely spaced N85W and N50E

897) Or oolitic banded chert and chert breccia; f: numerous, but disorganized and random

898) residuum abundant float of Ojc fine-grained, well-sorted quartz sandstone and chert breccia, numerous boulders, some with possible cataclastic shears

899) residuum large boulders of Ojc sandstone, chert breccia with sandstone matrix, and orthoquartzite float

900) residuum fine- to medium-grained, poorly sorted sandstone and chert float

Waynesville 7 ½' quadrangle

901) residuum brown clay with chert and Or sandstone float

902) residuum boulders of oolitic chert float

903) residuum brown clay with fragments of Ojc well-sorted sandstone and chert

904) Ojc small outcrop of quartz sandstone, surrounded by residuum containing quartz sandstone and chert fragments, some of which have medium-grained black chert grains; no reliable structural data

905) residuum very large boulders of Ojc sandstone and chert breccia float

906) residuum large boulders of chert breccia with sandstone matrix and fine-grained sandstone float

907) residuum float boulders of well-sorted , fine-grained sandstone as much as 3 ft in diameter

908) residuum yellow and reddish brown clay with float of poorly sorted quartz sandstone and orthoquartzite

909) outcrop? large float block? Or sandstone and chert breccia, heavy Fe oxides

910) Og thick-bedded, coarse-grained dolomite; common solution cavities; horizontal; f: medium-closely spaced N5-10E and N60W

3/15/95 Devil's Elbow 7 ½' quadrangle

911) residuum pseudo-outcrop of Or sandstone

Big Piney 7 ½' quadrangle

912) residuum Or sandstone and chert float

913) same as above

914) same as above

915) large collapse structure, obvious on topographic map

916) residuum red, slightly plastic clay; Or sandstone and chert float

917) same as above

918) same as above

919) Or medium- to coarse-grained quartz sandstone with tin beds containing coarse-grained white chert; general strike of E-W and northerly dip of 5-10°; f: dominant medium-spaced N-S, subordinate wide to medium spaced N40-45W and N70E

920) residuum large boulders of Or sandstone

921) Or fine- to medium-grained quartz sandstone, N40E 20°NW; surrounded by float of sandstone, porcelaneous and oolitic chert; symmetrical ripples elongated N45E; f: widely spaced N-S and N70W

922) Or fine- to medium-grained quartz sandstone; N15W 26°NE; f: medium-spaced N10W and N80W

923) Quaternary terrace 6-8 ft above present

924) Or very small outcrop of stromatolitic chert in creek bottom; no reliable structural data

925) Or two small outcrops of fine- to medium-grained quartz sandstone about 25 ft apart; N73E 14°NW and N45E 7°NW; f: medium- to closely spaced N25-30W and N60E

926) Or 5 ft of massive fine- to medium-grained quartz sandstone; N50E 12°NW; f: closely spaced N-S

927) Or small sandstone outcrop in creek bottom; horizontal; symmetrical ripple marks elongated N60W; f: closely spaced N35W and N60E

928) Or small outcrop of poorly sorted fine- to coarse-grained sandstone and orthoquartzite in creek bottom; horizontal; f: widely spaced N25W and N60E

929) Or small outcrop of massive sandstone in creek bottom; basically horizontal; f: widely spaced N55W and N45E

930) Or small outcrop of medium-bedded, fine-grained sandstone in creek bottom; N85W 22°NE; f: medium-spaced N35W 78°SW and N55-60E 70-75°SE

931) Og thick-= to thin-bedded fine-grained dolomite, no sand grains; numerous solution cavities; horizontal; f: medium-spaced

N35E solution widened

932) Og thick-bedded, fine- to medium-bedded dolomite; moss covered and damp; common solution cavities; horizontal; f: poorly developed E-W and N-S

933) Og thick-bedded, medium-grained dolomite and intraformational breccia; dripping seepage and small pools of water; horizontal; f: poorly developed N10W and E-W

934) Quaternary terraces 5-6 ft and 12-15 ft above present

935) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities, some as much as 1 ft in diameter; horizontal; f: medium-spaced N40E and N20-25W solution widened to moderately wide

936) Or medium-bedded, fine- to medium-grained quartz sandstone; small cave (Lost cave) with 5 ft diameter portal; horizontal; f: widely spaced N35-40E and 40-45W

937) Og stromatolitic chert and dolomite, several 6-8 ft-diameter heads; basically horizontal; f: very few and disorganized

938) Paleokarst structure exhumed by creek; huge boulders of Or sandstone, many >10 ft in diameter' overall random orientations, but locally coherent attitudes for adjacent blocks

939) base of 936), collapse structure or landslide/; mixed blocks of Or and Og material in chaotic orientations

940) Og thick-bedded, medium-grained dolomite and karst fill; strong solution features; f: closely spaced N30W and N70W solution widened to moderately wide to wide

941) Og medium-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: closely spaced N25W and N70W

942) Or medium- to thin-bedded, medium-grained dolomite; numerous solution cavities along bedding; horizontal; f: poorly developed N40W

943) Quaternary terrace 5-6 ft above present

944) Or fine- to medium-grained quartz sandstone; N65W 12°SW; f: widely spaced N65-75E and N25-35E

945) large collapse structure

946) Or fine- to medium-grained quartz sandstone in 945); N-S 31°E; f: wide- to medium-spaced N30W 52°SW

947) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone in 945); N72W 36°NE; f: medium- to closely spaced N-S and N25E

948) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; numerous attitudes-N35W 33°SW, horizontal, N32E 20°NE, N-S 33°W; symmetrical ripples elongated N45W; f: wide array, most dip 55-70°

949) Or fine- to medium-grained sandstone and orthoquartzite; N55W 14°SW; f: medium- to closely spaced N10E and N35-40W

950) Or medium-bedded, fine-grained quartz sandstone; horizontal; f: medium-spaced N35-40E and N20-25W

951) Og thin- to thick-bedded, medium-grained dolomite; moss-covered seeps and small standing pools; numerous solution cavities; horizontal to 4°NE dips; minor chalky alteration; f: close- to widely spaced N10-30E, irregular spacing

952) Og thin- to medium-bedded, medium-grained dolomite; several solution cavities as much as 1 ft in diameter and a few feet deep; dripping seepage; horizontal; f: medium-spaced N20E and N60W

953) Or/Og @ ~990-995 ft
Or medium-bedded, fine- to medium-grained quartz sandstone ledges; ~10 ft of outcrop covered by float and colluvium; horizontal; f: widely spaced N70-75W and N-S to N20W

Og 35-40 ft of medium-bedded, medium- to coarse-grained dolomite; numerous solution cavities and small caves; numerous dripping seeps; horizontal; f: widely spaced N10-20W and N65E

954) Og medium-bedded, medium-grained dolomite; moss-covered outcrop; numerous solution cavities and small caves; small spring

with several gal/m issuing out of small cave ~2 ft in diameter; horizontal; f: poorly developed N15E and N50E

955) Quaternary terrace ~10 ft above present

956) Og medium-bedded, medium-grained dolomite; numerous solution cavities; minor seepage; N65W 4°NE; f: widely spaced and poorly developed N35E

957) Og thin- to medium-bedded, medium-grained dolomite; numerous solution cavities; small spring issuing from one solution cavities ~1 gal/m steady; basically horizontal with perhaps a slight NE dip; f: poorly developed E-W

958) Quaternary terrace ~7 ft above present

959) Og medium-bedded, medium-grained dolomite and intraformational breccia; numerous solution cavities, some a few feet wide along bedding; damp and moss covered; horizontal; f: poorly developed with no particular orientation

960) Og medium-bedded, medium-grained dolomite and intraformational breccia; numerous solution cavities and small caves; horizontal; f: poorly developed with no particular orientations

961) same as above

962) Og medium- to thin-bedded, medium- to fine-grained dolomite; numerous solution cavities; damp seepage; small spring with several gal/m issuing out of one cavity; horizontal; f: widely spaced, poorly developed N40W and N10E

963) Or thin-bedded, fine- to medium-grained quartz sandstone and orthoquartzite overlying silicified chert breccia; 3-4 ft ledge outcrop; very minor seepage; horizontal; f: poorly developed, widely spaced N-S to N5E, better developed medium-spaced N20E at upper end of outcrop

964) residuum brownish red, slightly plastic clay with float fragments of poorly sorted sandstone, orthoquartzite, and chert

965) Or fine- to medium-grained quartz sandstone with thin (<1/4 in.) coarse grained intervals; outcrop is on margin of old

landfill, beds dip into filled area suggesting karst structure; N55E 14-20°NW; f: widely spaced N-S to N10E and N75-80W

966) Or oolitic chert breccia; N75E 10°NW; f: medium- to closely spaced N40W, N20E, and N45E

Bloodland 7 ½' quadrangle

967) residuum/colluvium float of Or sandstone, chert, and orthoquartzite

968) residuum red silt, sand, and clay; fragments of orthoquartzite, oolitic chert, chalcedonic chert, and poorly sorted sandstone

969) Or small outcrop of bedded oolitic chert in road ditch surrounded by red residuum loaded with angular fragments of banded chert and lesser oolitic chert; no reliable structural data

970) Quaternary terrace ~10-12 ft above present

971) residuum brownish-yellow clay; fragments of oolitic sandstone, cryptocrystalline chert, and dense reddish-brown quartz sandstone with chert; Ojcr

972) Quaternary loess; 1-2.5 ft thick; overlies residuum

973) same as above

974) residuum boulders of massive quartz sandstone

975) residuum yellowish-brown clay, fragments of oolitic and banded chert

976) same as above

977) same as above

978) same as above

979) same as above

Big Piney 7 ½' quadrangle

980) same as above

981) same as Above

982) same as above

983) karst collapse structure; float of drusy oolitic and banded chert

984) 2 small karst collapse structures, 4-5 ft deep and 10-20 ft in diameter; small spring coming out of residuum below

985) karst collapse structure

986) 3 small collapse structures, 10-15 ft in diameter and 3-4 ft deep, approximate N50W alignment

987) Og small outcrop of stromatolitic chert, somewhat brecciated; horizontal; no fractures

988) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N60W and N25E solution widened to wide

3/16/95 Big Piney 7 ½' quadrangle

989) colluvium/residuum Or sandstone and chert float, numerous boulders

990) Or small outcrop in creek bottom of orthoquartzite and chert breccia; symmetrical ripple marks elongated N65-70W; N30W 13°SW; f: medium-spaced N10E and N55E

991) Or thin- to medium-bedded quartz sandstone; N60E 15°SE; f: widely spaced N10E and N70W

992) Or thin-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N20E and N45W

993) Quaternary terrace 2-3 ft above present

994) Og thick-bedded, coarse-grained dolomite; several solution cavities; N70E 3-5°NW; f: poorly developed, widely spaced N10E and

N40E

995) Or ~25 ft above 994); medium- to thin-bedded, medium- to coarse-grained quartz sandstone; basically horizontal with slight undulations; f: widely spaced N-S

996) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities; horizontal; f: close- to medium-spaced N10E to N5W solution widened to moderately wide, and medium-spaced N80W

997) karst depression in hill slope

998) Og thick-bedded, medium-grained dolomite; large and extensive solution cavities, small exhumed and dissected cave; small seeps and standing pool; horizontal; f: poorly developed and/or obscured by extensive solutioning

999) Or thick-bedded to massive quartz sandstone; N35W 8°NE possibly due to slumping; f: widely spaced N15E

1000) Og small outcrop in creek bottom of thick-bedded, medium-grained dolomite and intraformational breccia; several solution cavities; moderate seepage; f: widely spaced N5W and N40E

1001) Og thick-bedded, medium- to coarse-grained dolomite; minor solution cavities; horizontal; f: medium-spaced N10-15E, some solution widened, some healed

1002) karst collapse structure in hillside, ~100-120 ft in diameter

1003) karst collapse structure at head of small draw, ~100 ft in diameter

1004) karst collapse structure in hillside, amphitheater shaped, ~120-150 ft in diameter

1005) Or fine- to medium-grained quartz sandstone and orthoquartzite; E-W 11°N; f: medium-spaced N-S

1006) false spring area, artificial flow, water dumped into head of drainage by water treatment plant

1007) Og medium- to thick-bedded, medium- to coarse-grained

dolomite; outcrop about 30 ft above creek; numerous solution cavities; horizontal; f: medium- to closely spaced N20-25E solution widened to moderately wide

1008) Og stromatolitic chert and dolomite; basically horizontal; f: few fractures with no consistent trends

1009) Og thick-bedded, medium- to coarse-grained dolomite; minor white chert lenses 2-3 ft long and 2-3 ft thick; numerous solution cavities some as much as 1 ft in diameter; horizontal; f: widely spaced N-S to N10E and 75-80E

1010) Og fine-grained, light-brown dolomite; vuggy with rounded carbonate mineralization; numerous solution cavities; horizontal; f: poorly developed N60W and N20-25E

1011) Og thick-bedded, coarse-grained dolomite; numerous solution cavities; overlies punky altered banded chert in creek bottom; horizontal; f: poorly developed N80W and N25-30E in some beds, no fractures in others

1012) Og thick-bedded, medium- to coarse-grained dolomite, several solution cavities; horizontal; f: widely spaced **through going** N10E moderately wide to wide

1013) Og thin-bedded chert, stromatolitic?; rotten weathered outcrop; heavy Fe oxides; no reliable structural data

1014) Og very small outcrop of gray and white chert in creek bottom; horizontal; f: closely spaced N20E

1015) Og ragged outcrop of weathered chert; no reliable structural data

1016) karst collapse structure, ~100-125 ft in diameter

1017) residuum 25-30 ft exposed in trench; float of poorly sorted sandstone, oolitic and porcelaneous chert

1018) Or thick-bedded to massive, medium-grained quartz sandstone; horizontal; f: widely spaced N20-25E and N25-30W, some wide from gravity and some healed

1019) seepage pools in creek bottom, no outcrops

1020) landslide? or karst collapse structure? in hillside

1021) Og medium-bedded, medium-grained dolomite; moss covered and damp seepage; horizontal; no reliable structural data

1022) Quaternary terrace 12-15 ft above present

1023) Og thick-bedded to massive, medium- to coarse-grained dolomite; numerous solution cavities; horizontal; f: widely spaced N15W, moderately wide

1024) Og medium- to thick-bedded, medium- grained dolomite; numerous solution cavities; horizontal; f: widely spaced N-S to N10E and N85E

3/18/95 Brownfield 7 ½' quadrangle

1025) boulders and pseudo-outcrop of silicified quartz sandstone, numerous brecciated, angular fragments; in part sedimentary and tectonic in appearance

1026) Ojc orthoquartzite clasts in sandstone matrix; dense, silicified; white to light gray; N45E 4-5°NW; f: very poorly developed, 1 that curves from E-W to N50W; little to no porosity; possible? N40E brecciated structure

1027) similar to above

Bloodland 7 ½' quadrangle

1028) Or boulders of quartz sandstone with cataclastic shears as much as 2 in. in width; pseudo-outcrop; N10-25W shears

1029) Or fine- to medium-grained quartz sandstone; N75E 7-10°NW; asymmetrical ripple marks N35W; f: **through going?** medium-spaced N50E, N15W, subordinate widely spaced N70W; interpreted dextral shear along N50E trend from fractures

1030) residuum fine-grained quartz sandstone boulders in bank

1031) Quaternary terrace 4-5 ft above present

1032) Or fine-grained quartz sandstone; N55E 5-14°NW; symmetrical ripple marks elongated N20E; 2 cataclastic shears at west end of outcrop-N80E 43°NW and N70E 90°; f: well developed, medium-spaced N-S, E-W, and N65E

1033) Or fine-grained quartz sandstone; horizontal to N-S 5°E; small spring issuing few gal/m, pools of standing water; f: medium-spaced N80W and N10E, many healed

1034) Or fine-grained quartz sandstone; large desiccation cracks 6 in. on a side; f: widely spaced N30E and E-W

1035) Or fine- to medium-grained quartz sandstone; bouldery outcrop; cataclastic shears N75-80E 90°; f: widely spaced N75-80E and N25-30W

1036) Or fine- to medium-grained quartz sandstone; undulating surfaces 0-10° asymmetrical ripple marks N80E; f: medium- to closely spaced N55E 75-90° and N35W

1037) same rock as above; f: close- to medium-spaced N60-65E and N15-20W

1038) Quaternary terrace 4-5 ft above present

1039) Or fine- to medium-grained quartz sandstone; undulating surfaces 0-10°; f: medium- to closely spaced N75W and N10E

1040) Or fine- to medium-grained quartz sandstone; asymmetrical ripple marks N80E; spring area, pools of standing water and minor flowage downstream develops into stream 4-6 ft across in short distance; f: wide- to medium-spaced N10W and E-W

1041) Or bouldery outcrop of massive sandstone; f: widely spaced N10-15E, gravity widened

1042) Or 3-4 ft-thick stromatolitic chert bed; horizontal; no prevalent fractures

1043) residuum/colluvium float boulders of Or sandstone; numerous cataclastic shears, braided 1/8-1/2 in. wide; no outcrops on

hillside

1044) small karst collapse structure? or bomb crater? 10 ft in diameter, 3 ft deep

1045) Or ledge of fine-grained quartz sandstone and orthoquartzite; N70W 12°SW; f: medium- to widely spaced N10-20E and N75-80W

1046) Og thick-bedded, medium- to coarse-grained dolomite; porous; dripping seepage; N65W 10°SW; rare gray and white chert nodules; f: widely spaced N50W 75°NE, one **through going**

1047) Or

~6 ft massive to thick-bedded, fine- to medium-grained quartz sandstone; horizontal to N40W 10°SW; f: widely spaced N20-25E 90° ±10°

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4 ft fine- to medium-grained dolomite; floating quartz grains; slightly porous; no fractures

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2-3 ft medium-bedded, fine-grained quartz sandstone; f: widely spaced N50W and N80E

1048) Or ~15 ft above 1047), covered in between with dripping seepage; 5-6 ft of ragged porcelaneous chert breccia with sandstone and oolitic matrix; f: no fractures

1049) Or ~25 ft above 1048); 4-5 ft-thick white and gray banded stromatolitic chert; no fractures

1050) Or ~15 ft above 1049); 5-6 ft of banded stromatolitic chert; no fractures

1051) Or thick- to thin-bedded, fine- to medium-grained, poorly sorted quartz sandstone; 15-20 ft thick, holds up ridge; undulating beds 0-10°, large-scale trough cross beds?; f: widely spaced N10W and N50-55E

1052) recent alluvial fan; material washed out of cleared area

1053) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities; horizontal; f: none

1054) Or/Og at ~1000 ft

Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; general E-W strike and 4°S dip; f: widely spaced N10-20E and N55-65W

Og thick- to medium-bedded, medium-grained dolomite; very rare chert nodules; several solution cavities; minor seepage; f: poorly developed E-W and N35W

1055) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities; horizontal; damp seepage; f: widely spaced N30W

1056) **FAULT** approximate N65W trend; surface not exposed; down to north approximately 67-70 ft; Og dolomite juxtaposed against Or sandstone; fault in 25-30 ft interval of no outcrop

1057) Or hanging wall of fault; 6-10 ft of medium- to thin-bedded, fine- to medium-grained quartz sandstone overlying 3-4 ft of medium-grained dolomite with suspended quartz grain; horizontal; f: widely spaced N75E, dominantly healed

1058) Or 5-6 ft of stromatolitic chert; dripping seepage; horizontal; f: none

1059) Or ~30 ft above 1058: thick-bedded, fine - medium-grained quartz sandstone; several 1/8-1/2 in.-thick silicified intervals; f: widely spaced N25W

1060) Or/Og contact in footwall of fault;

Og massive to thick-bedded; numerous solution cavities

Or medium-bedded, fine- to medium-grained quartz sandstone

1061) Or medium- to thick-bedded, fine-grained quartz sandstone; horizontal; f: widely spaced N45-55W

1062) Og thick-bedded, medium-grained dolomite; porous; several solution cavities; horizontal; f: poorly developed, inconsistent trends

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~3 ft of stromatolitic chert; dripping seepage

1063) Og collapsed cave entrance?; 30 ft bank collapse over ledge

1064) Or fine- to medium-grained quartz sandstone; E-W 12°S; f:

medium-spaced N10-20E

1065) colluvium/residuum Or sandstone and chert float

1066) Or fine- to medium-grained quartz sandstone; horizontal; widely spaced N15-20E and N40-45W

1067) Or oolitic chert; N80E 12°SE; f: medium-spaced N70E and N45W; overlain by fine-grained dolomite with no quartz

1068) Ojc fine-grained dolomite; irregular tubular white chert nodules; no quartz; horizontal; f: widely spaced poorly developed N60E

1069) Ojc Quarry Ledge fine-grained dolomite; small outcrop in road ditch; f: none

Brownfield 7 ½' quadrangle

1070) residuum float blocks of fine-grained, well-sorted quartz sandstone, some with chert fragments

1071) residuum float blocks of fine-grained quartz sandstone; silicified sandstone; some white chert nodules

1072) same as above

1073) same as above

1074) boulder pile of orthoquartzite and fine-grained, well-sorted quartz sandstone, some containing white chert

1075) same as above

Bloodland 7 ½' quadrangle

1076) spring?; ponded water

1077) karst collapse structure

1078) boulder pile of fine-grained, well-sorted quartz sandstone, some containing white chert and orthoquartzite

1079) Ojc Quarry Ledge fine-grained dolomite; quartz-lined vugs; small Fe-oxide concretions; basically horizontal; f: poorly developed, medium- to widely spaced N5W, N50E, and N75W

1080) residuum boulders of oolitic sandstone

1081) residuum float boulders of quartz sandstone containing ripple marks

1082) residuum float boulders of fine-grained quartz sandstone

1083) same as above

1084) residuum chert float

1085) Or medium-bedded, fine- to medium-grained, poorly sorted quartz sandstone; undulating surface, <10° dips; f: widely spaced N65E and N25W

3/19/95 Devils Elbow 7 ½' quadrangle

1086) Or medium-bedded orthoquartzite; drusy; minor red, friable quartz sandstone; N45-50W 10°NE; f: medium- to closely spaced N5-10W and N85W

1087) Or small outcrop in road ditch; fine-grained, moderately well-sorted, medium-bedded quartz sandstone and thin-bedded Fe-stained bedded chert; horizontal; f: medium to closely spaced N15-20W and N70-75E

1088) residuum reddish-brown slightly plastic clay; chert and sandstone float, minor orthoquartzite

Waynesville 7 ½' quadrangle

1089) same as above

Bloodland 7 ½' quadrangle

1090) residuum brown clay

1091) karst collapse structure ~50 ft in diameter and 20 ft deep; float of Or sandstone, orthoquartzite, and chert

1092) residuum reddish-brown clay; float of ooltic chert (slightly drusy), sandstone, and banded gray-white chert

1093) same as above

1094) same as above

1095) Or fine- to coarse-grained, poorly sorted quartz sandstone and minor white chert; N65W 10-14°SW; symmetrical ripples elongated N18E; f: medium-spaced N40W and N30E

1096) Quaternary terrace ~8-10 ft above present

1097) dissected high level Quaternary terrace , 10-30 ft above 1096)

1098) Or medium- to thin-bedded, fine- to coarse-grained quartz sandstone; strongly contorted attitudes; N25W 26°SW, horizontal, N40W 15°NE, N35W 25°NE, N60W 34°SW, N40E 40°SE, N25W 52°SW; f: medium-spaced N70E, N35E, N55W and N-S, N30E, N40W 60-75°NE, N40E 75°SE, closely spaced N65W 60°NE

1099) Or stromatolithic chert and chert breccia; f: closely spaced N35W and 45-50E

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thin-bedded, fine- to medium-grained quartz sandstone; N15E 5-15°SE; asymmetrical ripple marks towards N50W, symmetrical ripple marks elongated E-W; f: closely spaced N45W and N25-30E

1100) Or medium- to thin-bedded, fine- to coarse-grained sandstone; horizontal to N10E 12°NW; f: **through going** medium-spaced N40E and not through going N50W

1101) Excellent exposure of Or/Og contact @ 945'; gentle westerly dip; sag of a few inches on N20E fractures with seepage
Or
2-3' thin-bedded quartz sandstone; ripples; f: widely spaced N50-55W and N40-45E

3' thin-bedded, sandy dolomite; minor seepage; no fractures

2.5-3' medium- to thin-bedded quartz sandstone; no fractures

1-1.5' sandy, drusy chert; no fractures

4" medium-grained dolomite, sand along base

8-10" thin-bedded, coarse-grained sandy dolomite; seepage

2.5' thick-bedded, fine-grained dolomite, druse-lined vugs; f: medium-spaced N20E

sharp contact with mud cracks on lower surface

Og
3' medium-grained dolomite; numerous, well-developed solution cavities; no fractures

1102) stromatolitic chert beds ~ 25' above 1101)

1103) Or 25-30' stromatolitic chert, chert breccia, and dolomite? overlain by thin- to medium-bedded quartz sandstone; dips a few degrees to west; large pool of water; f: in sandstone, widely spaced N40W and N45-50E

1104) Quaternary terrace ~2' above present on west bank, higher terrace ~6-8' above present on east bank

1105) Or stromatolitic chert and chert breccia; f: medium-spaced N30-35W

1106) Or medium- to thin-bedded, medium- to coarse-grained quartz sandstone; N70E 4-5°NW; dripping seepage; f: medium-spaced N10W and N60E

1107) Quaternary terrace ~8' above present
Og coherent beds medium-grained dolomite exposed in creek bottom below terrace; N10W 25-46°NE; FAULTED?

1108) Og ~15' uphill from 1107); medium-grained, medium- to thick-bedded dolomite; numerous solution cavities; N15E 20°NW; poorly developed fractures at random orientations

1109) Og thick-bedded, medium- to coarse-grained dolomite; several solution cavities; N30E 5°NW; f: poorly developed N20-25W

1110) Quaternary terrace ~5-6' above present

1111) Or stromatolitic chert and fine- to medium-grained, thin-bedded quartz sandstone; N30E 6°NW; f: inconsistent and poorly developed

1112) Or medium- to thin-bedded, fine- to medium-grained sandstone and thin-bedded sandy dolomite; N80W 10°10SW; pools of standing water; f: in sandstone, poorly developed N35W

1113) Or/Og
quartz sandstone

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medium-grained dolomite; numerous solution cavities; no fractures

1114) Or thin- to medium-bedded, medium- tp coarse-grained quartz sandstone and orthoquartzite; basically horizontal; f: widely spaced N5-15E, some healed
Quaternary terrace on top of outcrop, ~10' above present

1115) Or/Og
only 1-2' of Og at base of hill overlain by 10+' of Or; same sequence as 1101); N50E 3-4°NW; f: widely spaced N70W and N10E

1116) Or same sequence as 11150, but Og is not exposed; dripping seepage; f: widely spaced N65-70W and N40E

1117) Og medium- to thin-bedded, medium-grained dolomite, no sand; basically horizontal; dripping seepage into 4' deep standing pool; common solution cavities, especially low in outcrop; f: poorly developed and inconsistent

1118) Or area of small ledge outcrops of quartz sandstone, orthoquartzite, and stromatolitic chert; f: inconsistent and poorly developed or poorly exposed

1119) residuum/colluvium, float of Or sandstone, orthoquartzite, and chert

1120) Ojc Quarry Ledge Member; massive fine-grained dolomite, cotton rock; horizontal; f: widely spaced N80E and N60W

1121) residuum boulders of Ojc Quarry Ledge Member

1122) Ojc thin- to very thin-bedded, fine-grained dolomite; horizontal; f: very poorly developed N75-80W

1123) Ojc thin- to very thin-bedded, fine-grained, well-sorted quartz sandstone; mudcracks; N40W 13°SW; f: medium-spaced N70W and N15W

1124) Ojc Quarry Ledge; horizontal; no fractures

1125) Or fine- to medium-grained quartz sandstone; thin- to very thin-bedded; N60E 13°NW; f: numerous, fine polygonal cracks

3/20/95 Bloodland 7 1/2' quadrangle

1126) residuum light-reddish brown clay; fragments of orthoquartzite, banded chert and fine-grained, well-sorted sandstone

1127) same as above; large, recently stripped area

1128) residuum dark, reddish brown clay, slightly plastic and sandy; fragments of ooltic chert and quartz sandstone

1129) residuum large area recently stripped; brown clay; fragments of oolitic sandstone and orthoquartzite

1130) residuum pseudo-outcrop of Or quartz sandstone

1131) residuum large, recently stripped area; reddish brown clay; fragments of white and gray chert, sandstone, orthoquartzite, and oolitic chert

1132) Or small outcrop of thick-bedded, fine- to medium-grained quartz sandstone; N5W 6°SW; f: widely spaced N35E and N45W

1133) Quaternary terrace ~8-10' above present on both sides of valley; remnant of higher surface on east side

1134) Or 3' medium- to thick-bedded, fine- to medium-grained quartz sandstone containing chert lenses overlain by medium-bedded, medium-grained, sandy dolomite; basically horizontal; f: medium-spaced N45E and N40W

1135) Or 20-25' of medium- to thin-bedded, fine- to medium-grained dolomite (some beds contain quartz, some do not) and bedded chert; thin-bedded sandstone and orthoquartzite at top; horizontal; f: poorly developed and inconsistent to non-existent

1136) Or fine- to coarse-grained sandstone; N20E 12-19°SE; f: 5' zone of closely spaced N55W, elsewhere medium-spaced N50-55W and N-S to N10E

1137) Or fine- to medium-grained quartz sandstone and bedded oolitic chert; mudcracks; horizontal; f: medium-spaced N10-20W and N60-70E

1138) Or medium-bedded, fine- to coarse-grained poorly sorted quartz sandstone; asymmetrical syncline and anticline pair exposed in creek bottom, axis strikes N10-20E, limbs dip 5°SE, 24°NW, 4-5°SE; irregular saddles and ridges along strike; f: numerous, well-developed, medium- to closely spaced N30-40W, N10-15E, and N80W to E-W

1139) Or small outcrop of stromatolitic chert; ragged and jagged; horizontal; no fractures

1140) Or thin-bedded stromatolitic chert, fine-grained quartz sandstone, and orthoquartzite; E-W 3-4°S; f: in sandstone, medium-spaced N40W and N10E, in chert, poorly developed N40E and N50-55W, largely closed

1141) residuum reddish-brown clay; fragments of sandstone, chert, and orthoquartzite; Orr

1142) residuum similar to above; wide, recently cleared area

1143) similar to above

1144) residuum/colluvium cobble and boulder float of Or sandstone and chert

1145) Or orthoquartzite (silicified medium- to coarse-grained quartz sandstone); mudcracks; asymmetrical ripple marks towards S; basically horizontal with small amplitude rolls; f: closely spaced N25-40W and N80W to E-W

1146) Or similar to above; medium to thin bedded; symmetrical ripple marks elongated N-S; f: closely spaced N25-40W and N80W to E-W

1147) Or thin- to medium-bedded, fine- to coarse-grained, poorly sorted quartz sandstone; low-amplitude anticline with N35W axis and 10° limbs; f: medium- to closely spaced N35-40W

1148) Or ragged outcrop of stromatolitic chert; heavy Fe-oxides; no reliable structural data

1149) Or medium-bedded, fine- to coarse-grained, poorly sorted, quartz sandstone; rolling surface with general SW dips; f: medium- to closely spaced N15W to N10E and N80W to E-W

1150) residuum reddish-brown clay; fragments of orthoquartzite, chert, and sandstone; Orr

1151) residuum yellowish-brown clay; fragments of banded chert; Ojcr

1152) residuum boulders of orthoquartzite and fine- to coarse-grained sandstone; Orr

1153) Or thin- to thick-bedded sandy chert and fine- to medium-grained quartz sandstone; undulating surface 0-10° dips; symmetrical ripple marks elongated N20-25E and N30-40W; f: medium-spaced N5-30E and N25-40W

1154) residuum/colluvium float of chert and sandstone

1155) Wolf Den Cave at bottom of karst collapse structure; 50' wide, N60W direction, 160' long

1156) residuum dark red clay; fragments of chert and sandstone

1157) residuum/colluvium float of Or sandstone, orthoquartzite, and chert

1158) Or thin- to medium-bedded orthoquartzite and fine- to medium-grained quartz sandstone; horizontal; f: close- to medium-spaced N55W, N25E, and N65E

1159) Ojc Quarry Ledge; massive, fine-grained dolomite; porous; horizontal; no fractures

1160) Or thin- to medium-bedded, medium-grained dolomite (stromatolitic) and fine-grained quartz sandstone; horizontal with minor undulations; dolomite is slightly vuggy, lined with euhedral dolomite crystals; f: poorly developed N55-60W

1161) Or thin-bedded, fine- to medium-grained quartz sandstone with some white chert grains; mudcracks; overlain by stromatolitic chert (bleached and slightly punky); sandstone undulates slightly, chert is horizontal; f: in sandstone, medium- to closely spaced N25W and N75-80W, none in chert

1162) residuum yellowish-brown clay; fragments of sandstone and chert

1163) residuum reddish-brown clay; fragments of sandstone and chert

1164) Or thin-bedded, fine- to medium-grained quartz sandstone; horizontal with minor undulations

1165) Or similar to above; asymmetrical ripple marks towards S60W

1166) Or massive to thick-bedded, fine-grained quartz sandstone; general N60-70E 0-10°NW; asymmetrical ripple marks towards N20E; f: widely spaced N-S and N80-85W

1167) Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; undulating surface; f: medium-spaced N15E and N25-30W

1168) Or massive to thick-bedded, fine- to medium-grained quartz sandstone; undulating surface 0-15°; f: medium-spaced N20E and N70W

1169) Or stromatolitic chert in creek bottom, 3-4' thick; horizontal; f: poorly developed and inconsistent

1170) Or similar to above; damp seepage; chalky alteration; f: widely spaced N45W and N35-40E

1171) Or massive to thick-bedded, fine- to coarse-grained quartz sandstone; ledge 15-20 ft above creek; horizontal; f: widely spaced N-S to N10E and N75-80W

1172) Or massive to thick-bedded, fine- to coarse-grained, poorly sorted quartz sandstone; horizontal; f: widely spaced N25-30E and 35-40W

1173) Or massive to thick-bedded, fine- to medium-grained sandstone; N25W 4°NE; f: **through going** widely spaced N45W and N35E

1174) Or thick-bedded with thin partings, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N15W and N70E

1175) Or same horizon as above; horizontal; f: widely spaced N25W and N60E

1176) Or massive, fine- to medium-grained quartz sandstone; N15E 15°NW; f: widely spaced N35-40W and N55E 75-85°SE

1177) Or medium-bedded to massive, fine- to medium-grained quartz sandstone; undulating bedding; asymmetrical ripple marks towards N40W and N70E; f: widely spaced N30W and N50E

1178) residuum Ojcr; boulders of fine-grained, well-sorted quartz sandstone with white chert nodules

1179) Or oolitic chert and thin-bedded quartz sandstone; horizontal; f: closely spaced N70W and N-S to N10W

1180) residuum/colluvium Or sandstone and chert float

1181) residuum yellowish-brown clay; fragments of oolitic chert, sandstone, and porcelaneous chert

1182) Ojc Quarry Ledge, massive, fine-grained dolomite and very thin-bedded mudstone and fine-grained dolomite; horizontal; outcrop surrounded by residuum containing abundant drusy chert fragment; no fractures

1183) residuum yellowish- and reddish-brown clay; fragments of fine-grained sandstone with desiccation cracks and banded chert; Ojcr?

1184) residuum light-brown clay; pebbles and granules of chert and sandstone; Ojcr

1185) similar to above

1186) Ojc small outcrop of very fine-grained, well-sorted quartz sandstone; massive; no reliable structural data

1187) residuum light-brown clay; pebbles and granules of chert and lesser sandstone

1188) residuum fragments of banded, oolitic, and chalcedonic chert

1189) Ojc medium- to thin-bedded, fine- to medium-grained dolomite and mudstone; white nodular cherts; horizontal; f: medium-spaced N75-80E and N20W, solution widened to wide

1190) residuum virtually no float; loess like

1191) residuum yellowish-brown clay; fragments of banded and chalcedonic chert and lesser fine-grained sandstone

1192) similar to above

1193) Ojc very thin-bedded mudstone and chert overlying massive fine-grained dolomite (Quarry Ledge); horizontal; f: irregular

1194) residuum fragments of Ojc sandstone and chert

1195) Quaternary loess overlying residuum of Or

1196) residuum reddish-brown clay; fragments of Or sandstone and chert

3/21/95 Bloodland 7 ½' quadrangle

1197) Or intercalated thick- to medium-bedded, sandy dolomite and medium- to thin-bedded, fine- to medium-grained quartz sandstone; N45E 6°NW; f: poorly developed and widely spaced N40W, primarily in sandstone

1198) Or/Og thick-bedded, medium-grained dolomite (no sand) overlain by sandy dolomite and quartz sandstone of 1197); dripping seepage in Og; minor solution cavities; horizontal; f: widely spaced N55W and N25E in both Or and Og

1199) Og thick-bedded to massive dolomite; numerous solution cavities; ~10 ft ledge overhang that appears to be side of breached cave; dripping seepage; f: poorly developed N75W and N35E

1200) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N15-20E and E-W

1201) Or/Og fine- to medium-grained quartz sandstone overlying massive medium-grained dolomite containing numerous solution cavities; horizontal; f: medium-spaced N45W and N50-55E

1202) good outcrop of Or/Og contact
Or 25-30 ft quartz sandstone and sandy dolomite; f: widely spaced N-S to N10E and N70-75W

Og 15 ft thick-bedded to massive, medium-grained dolomite; common solution cavities and small caves; horizontal; dripping seepage; f: widely spaced N45W

1203) cave; ~10 ft ledge overhang in lower Or sandstone leads into 6 ft wide, 3 ft high portal; portal largely filled; tunnel at N30W for at least 30 ft; cave developed near Or/Og contact; dripping seepage from back; no apparent fractures

1204) 2 karst collapse structures in hillside; ~30 ft in diameter and 10 ft deep; developed on high-level terrace; rough N80E alignment

1205) Or stromatolitic chert; horizontal; f: poorly developed and inconsistent

1206) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities and small caves up to 1 ft in diameter; horizontal; f: widely spaced N45E and N75W solution widened to wide

1207) Og karst and cave area; thick-bedded to massive, medium-grained dolomite; abundant small caves as much as 5 ft in diameter, largely collapsed and filled with debris; f: widely spaced N55W, **one through going**, and N45-65E

1208) cave; in Og; portal almost totally closed, perhaps 10 ft in diameter

1209) karst collapse structure in hillside, ~25 ft in diameter

1210) Quaternary terrace, ~ 12 ft above present stream floor

1211) Og massive to thick-bedded, medium- to coarse-grained dolomite; abundant solution cavities and small caves up to 1 ft in diameter; possible collapsed cave portal; spring area? increased flow and fish in stream; horizontal; f: widely spaced N15E

1212) karst collapse structure in hillside; 40-50 ft in diameter

1213) Og medium-bedded, medium-grained dolomite; common solution cavities; horizontal; f: medium-spaced N35E and N60W

1214) Og several small collapse structures 10-15 ft in diameter

1215) Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; horizontal; f: poorly developed and inconsistent

1216) Quaternary terrace

1217) small landslide

1218) Og medium- to thick-bedded, medium- to coarse-grained dolomite; porous with dolomite overgrowths; minor solution cavities; horizontal; f: widely spaced N45W and N35-40E

1219) Og thick-bedded to massive, medium- to coarse-grained dolomite; numerous solution cavities and small caves; horizontal; damp and dripping seepage; f: poorly developed N55W and N15E

1220) Og small cave, ~4 ft diameter portal filled with debris about 12 ft in; N15E trend; dripping seepage from back; no prominent fractures

1221) Or ledge forming; medium- to thin-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N25E and N60-75W

1222) large cave in Og at creek level; 15 ft ledge overhang; 12 ft diameter portal largely filled with alluvium; dripping seepage into 4-5 ft deep pool; school of fish 4-5 in. long; Og thin- to medium-bedded, medium-grained dolomite; N70E 4-5°NW; f: none

1223) Or/Og contact; ~ 20 ft above 1222)

1224) Or ledge-forming, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N25E and N75W

1225) 3 karst collapse structures in hillside; 1 is 40-50 ft in diameter, 2 are ~ 25-30 ft in diameter

1226) large collapse structure in hillside; 100-120 ft in diameter

1227) Og thick-bedded to massive, medium- to coarse-grained dolomite; common solution cavities; 20 ft bluff with probable collapse structure at base; horizontal; f: widely spaced **through going** N70W and N30E

1228) Og medium-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N45W and N20-25E

1228) Og medium-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N45W and N20-25E

1229) Or ~30 ft above 1228); thin- to medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N10-20E and N75W

1230) Og thick-bedded, medium-grained dolomite; common solution cavities; horizontal; f: widely spaced N80W

1231) karst collapse structure and landslide, ~100-120 ft in diameter

1232) karst collapse structure

1233) ledge of Or sandstone

1234) similar to above

1235) Og medium- to thick-bedded, medium- to coarse-grained dolomite; horizontal; f: medium-spaced N50W and N35E

1236) several small caves in lower Or and at Or/Og contact; collapsed and filled portals

1237) Or 2 ft ledge of thin-bedded, fine- to medium-grained quartz sandstone; horizontal; no discernable fractures

1238) Or thin-bedded, fine-grained quartz sandstone and sandy dolomite; small cave at alluvium level, largely filled with alluvium; N-S 14°W f: medium-spaced N-S, N50E and N60-65W

1239) spring? pool of water flowing downstream, dry above this point

1240) Or thin- to medium-bedded, fine- to medium-bedded quartz sandstone; desiccation cracks; basically horizontal; f: widely spaced N55W and N15-20E

1241) Or thin- to medium-bedded, fine- to coarse-grained quartz sandstone; desiccation cracks; horizontal; f: wide- to medium-spaced N50W and N15-20E

1242) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N45W and N35E

1243) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: medium-spaced N55E and N50W

1244) Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; N50E 10-15°SW; minor seepage; f: medium-spaced N45-50E and N45W

1245) residuum/colluvium Or and Ojc float

1246) similar to above

1247) Or medium-bedded, fine- to medium-grained quartz sandstone and chert breccia; seepage, small pools of water;
horizontal; f: widely spaced N30E and N60E

1248) Quaternary terrace ~12 ft above present floor

1249) residuum yellowish-brown clay; fragments of chert and sandstone with chert; Ojcr

1250) colluvium/residuum Or sandstone and chert float

1251) Og outcrop in creek bottom; massive, medium-grained dolomite; porous and vuggy; intense solution cavity development; exhumed cave?; basically horizontal; f: widely spaced N70E and N15W solution widened

1252) colluvium/residuum Or sandstone and chert float

1253) Or medium-bedded, fine- to medium-grained quartz sandstone and sandy dolomite; numerous solution cavities in dolomite; horizontal; f: medium- to widely spaced N45W and N40E

1254) colluvium/residuum float of Or sandstone and chert

1255) Quaternary loess; 1-2 ft over residuum

1256) similar to above

1257) Or bedded oolitic chert; horizontal; f: medium-spaced N25E and N45W

1258) Or thin-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N35E and N75W

1259) colluvium/residuum Or sandstone and chert float

1260) karst collapse structure

1261) residuum recently cleared area; reddish-brown clay; fragments of Or sandstone and chert

1262) Or medium-bedded, fine- to medium-grained quartz sandstone; N40W 10-15°NE; f: medium- to closely spaced N75W and N35E

1263) Or fine-grained quartz sandstone; horizontal; f: medium-spaced N80W and N10W

1264) residuum light-brown silty clay; fragments of oolitic chert, cryptocrystalline chert, and rare Fe-oxide nodules; Ojcr

1265) similar to above

1266) karst collapse structure

1267) karst collapse structure

3/22/95 Bloodland 7 ½' quadrangle

1268) Og questionable outcrop; has slump appearance; medium-grained dolomite; no reliable structural data

1269) karst collapse structure; 10-12 ft in diameter, 4-5 ft deep; on old forest road

1270) colluvium/residuum float of fine- to medium-grained quartz sandstone and chert breccia

1271)Or fine- to medium-grained quartz sandstone; N5W 12°SW; f: medium-spaced N60W and N35E

1272) first signs of seepage and flow in valley; no outcrops

1273) Quaternary terrace multiple terrace levels; at least three above present

1274) Og thick-bedded to massive, medium-grained dolomite and intraformational breccia; numerous solution cavities and small caves as much as 3 ft in diameter; horizontal; f: widely spaced poorly developed N45W and N30E

1275) Og massive to thick-bedded, medium- to coarse-grained dolomite; no chert; numerous solution cavities especially along bedding; horizontal; f: 1 **through going** N55W, otherwise widely spaced N55-60W and N20-25E

1276) karst? break in bluff exposure

1277) Og massive to thick-bedded, medium- to coarse-grained dolomite; no chert; numerous solution cavities and pinnacles; horizontal; f: widely spaced N70W

1278) Og massive to thick-bedded, medium- to coarse-grained dolomite; several solution cavities and small caves as much as 1 ft in diameter; f: medium-spaced N80W and N20E in some beds, none in others

1279) Og massive to thick-bedded, medium-grained dolomite;

intervals of damp and dripping seepage with pastel-green clay minerals; numerous solution cavities and small caves along bedding and as chimneys; f: widely spaced, prominent N-S (along bluff face) and N75-80W

1280) Og thick-bedded crystalline chert and chert breccia; f: none discernable

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thick-bedded, medium-grained dolomite; numerous solution cavities along bedded and fractures; porous; f: medium- to closely spaced N-S, solution widened, and N75-80W

1281) Quaternary terrace 15-20 ft above present valley floor

1282) Og thick-bedded, medium-grained dolomite; rare solution cavities; horizontal; f: widely spaced N55W, N80E, and N40E

1283) Og thick-bedded, medium- to coarse-grained dolomite; several solution cavities; damp seepage; horizontal; f: widely spaced N45E and N55W

1284) spring area at Or/Og contact; ~950 ft elevation

1285) Og thick-bedded, medium-grained dolomite; numerous solution cavities along bedding; horizontal; f: medium-spaced N45E and N55-60W

1286) Og thick-bedded, medium-grained dolomite; several solution cavities; horizontal; f: widely spaced N5E to N-S **through going** and N45-50W

1287) karst collapse structure in hillside amphitheater ~100 ft in diameter

1288) karst collapse structure?; elongated depression with E-W trend; ~200 X 50 ft

1289) residuum/colluvium; boulder 6+ ft of massive, fine- to medium-grained quartz sandstone; ledge of sandstone across road

1290) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; dripping seepage and small pools of water; horizontal; f: medium-spaced N20E and N45W

1291) Or medium- to thick-bedded stromatolitic chert, chert breccia, and fine-grained dolomite; numerous solution cavities in dolomite; horizontal; f: widely spaced, poorly developed N20-25W and N85E

1292) Or stromatolitic chert and chert breccia in creek bottom; pools of water; no discernable fractures

1293) Or medium- to thin-bedded, fine- to medium-grained dolomite and very thin-bedded mudstone; Fe-oxides after pyrite in dolomite; horizontal; f: medium-spaced N40W and N55E

1294) Or stromatolitic chert and slightly sandy, fine-grained dolomite; horizontal; f: poorly developed N35-40E in dolomite

1295) spring area, many gal/m flow below this point; no outcrops
1296) Or medium-bedded, fine- to medium-grained quartz sandstone; basically horizontal with minor undulations; f: widely spaced N-S and N80E

1297) Or ragged outcrop of stromatolitic chert; quartz sandstone float directly overlies; no reliable structural data

1298) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities and small caves as much as 8 ft deep; dripping and damp seepage; horizontal; F; widely spaced N55W and N40-45E

1299) karst collapse structure; ~100 ft diameter amphitheater structure in hill slope; overlain by Or stromatolitic chert

1300) Og medium-bedded, medium-grained dolomite; horizontal; f: poorly developed and inconsistent

1301) Og medium- to thick-bedded, medium- to coarse-grained dolomite; N25W 5ºNE; f: **through going** medium- to widely spaced N35-40E and N50W

1302) Og medium-bedded, medium- to coarse-grained dolomite; horizontal; f: poorly developed N25E and N40W

1303) karst collapse structure in hillside 70-80 ft in diameter

1304) Og stromatolitic chert in creek bottom; f: widely spaced N40W

and N50-55E

1305) Og thick-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N40W, N45E, and E-W, some solution widened

1306) karst collapse structure in hillside 120-150 ft in diameter

1307) Og thick-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N35W, N55E, and E-W

3/23/95 Waynesville 7 ½' quadrangle

1308) Or stromatolitic chert; basically horizontal; local concentrations of Fe-oxides; f: medium-spaced N25-30E, N30-40W, and N60E

1309) Og large bluff of massive to thick-bedded, medium-grained dolomite

1310) Og small outcrops in road ditch and creek bottom; no reliable structure data

1311) Or small outcrops of quartz sandstone in road ditches; no reliable structural data

1312) similar to above

1313) similar to above

1314) Or fine- to coarse-grained, poorly sorted quartz sandstone with minor chert and orthoquartzite; horizontal; f: medium- to widely spaced N30W and N60E

Bloodland 7 12' quadrangle

1315) Og stromatolitic chert; heavy Fe-oxides; horizontal; f: medium-spaced N10W and E-W

1316) Og stromatolitic chert and chert breccia; N-S 8ºE; Fe-oxide stains; f: widely spaced, poorly developed N45W and N55E

1317) Og thick- to medium-bedded, coarse-grained dolomite;

scattered solution cavities in some beds; horizontal; f: medium-spaced N25E and N35W

1318) Og thick-bedded, coarse- to medium-grained dolomite; numerous solution cavities; f: medium-spaced N80E to N75W and N35E

1319) Og thick-bedded to massive, medium-grained dolomite and intraformational breccia; numerous solution cavities and small caves as much as 1 ft in diameter; horizontal; f: poorly developed N10E solution widened, N60E, and N20-25W

1320) cave; portal ~15 ft wide and 18-20 ft wide; N75-80W trend for ~30 ft, then forks to S20W for undetermined distance; largely filled with collapsed material ~30 ft in; Og thick- to medium-bedded, coarse-grained dolomite; 3-4 ft thick intraformational breccia with chert in back; N15E 3-4°NW; abundant solution cavities; 10 ft high chimney ~20 ft in; minor dripping seepage; f: medium spaced **through going** N35-40E and N80E, solution widened at portal, elsewhere none

1321) Og stacked caves, 1- 4 ft in Diameter and 1- 10 X 6 ft; also karst area ~150 ft to south in same horizon, N50-55E trend; f: widely spaced N10-15E solution widened and N50-55E in surrounding rocks, none in back of cave

1322) Og massive to thick-bedded, coarse- to medium-grained dolomite; numerous solution cavities; cave ~15 ft up bluff face with water dripping below; small spring on west end of outcrop; f: in bluff below cave, widely spaced N15E solution widened

1323) Og massive to thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities and small caves 2-3 ft in diameter; horizontal; f: **through going** widely spaced N75W and N-S to N10E

1324) Og cave; portal- 20 ft wide and 15 ft high; filled with terra rosa about 25 ft in; minor dripping seepage; numerous drip stone formations; general NW strike 4-5°SW dip; medium- to thick-bedded, medium-grained dolomite and 4-5 ft thick horizon of stromatolitic chert and intraformational breccia; f: wide- to medium-spaced N25-35E and N60-70W, most solution widened and some **through going**

1325) Og same horizon as 1324); about 200 ft south; f: medium

spaced **through going** N70-75W solution widened and dripping seepage

1326) Og same horizon as above; about 200 ft south; numerous solution cavities; strong dripping seepage about mid-bluff to top of bluff about 40 ft up; f: narrow zone of **through going** N85W and N35E solution widened

1327) karst collapse structure and/or gravity slide structure; large amphitheater ~300 ft in diameter

1328) high-level Quaternary terrace?

1329) Og medium-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N75-80W and N30-35E

1330) Or hard ledge of drusy chert in road bottom at break in slope; probably in place; no reliable structural data

3/5/95 Waynesville 7 ½' Quadrangle

1331) Og fine- to medium-grained dolomite; one thick bed exposed on stream floor, knobbly with chert blobs and stromatolites, horizontal; f: N20W, N50W, N45E, moderately to widely spaced, solution widened.

1332) water sinks into gully floor, bend above sink exposes bank of either slump or residuum, no outcrop.

1333) Og medium- to coarse-grained, thin- to medium-bedded dolomite; horizontal; in small ledge above seep that begins stream; outcrop three feet high, with one 2" thick chert layer near base and a small cave 1' wide by 3' long by 6" high; f: N10W, N60W, moderately spaced, solution widened.

1334) Og medium- to thick-bedded, medium- to coarse-grained dolomite interbedded with stromatolitic chert; in 2 foot high ledge on side of bank; horizontal; f: N70W, N25E, solution widened, moderately spaced, vuggy solution pattern on joint surfaces

1335) residuum/colluvium Or rubble, erratically scattered, mostly chert, sparse sandstone, no outcrop

1336) Seepage from clay on gully bank (filled sink?), about 4 feet

above gully bottom

1337) Og fine- to medium-grained, thin- to medium-bedded dolomite; vuggy; horizontal; poorly exposed ten foot high ledge; f: widely spaced N20E, N70E, N60W, solution widened

1338) Or fine- to medium-grained quartz sandstone; one thick bed exposed, brecciated; horizontal; covered with moss and lichen on stream bed; f: N40E, N55W, N10E, N70E, N85W, moderately spaced, depth indeterminate, no solution widening

1339) residuum; Or chert rubble and erratic sandstone boulders, no outcrop

1340) Or chert, stromatolitic, about 2' thick bed; horizontal; f: N20E, N5W, N40W, moderately spaced,

Wednesday, 15 March 1995 Waynesville 7 1/2' quadrangle

1341) Og chert, thick bedded, stromatolitic, white to dark-gray; no obvious dolomite; horizontal; f: N30E, N15W, E-W, closely spaced,

1342) residuum; chert rubble, no outcrop

1343) residuum; chert rubble, no outcrop

1344) Og fine-grained dolomite with blobs of white chert; one thick moss-covered bed present; horizontal; f: N20E, N25W, moderately spaced, solution widened and vuggy surfaced

1345) Og chert; twenty foot high bluff with terra rosa between chert pillars; chert white to dark-gray, layered to brecciated; layered part has N43E 19°NW attitude; bedding thin to thick, vuggy surface texture where not freshly broken; small caves ~1 ft high and 2-3 ft deep; f: N20W (closely spaced), N50E (moderately spaced), **through going**

1346) Og chert, on stream bank, medium-bedded, white to dark-gray, about 2 feet exposed; horizontal; f: N10E, N35E, closely spaced,

1347) Og medium-grained, thin- to medium-bedded dolomite;

horizontal; five-foot ledge on creek bank, some beds vuggy and others not; f: N25E, N5W, N50W, moderately spaced, a few solution widened but most not

1348) Og medium-grained, thin- to medium-bedded dolomite; lenses of brecciated chert; horizontal; poorly exposed 10-foot high bluff; f: N40E, N25W, NS, closely spaced,

1349) Og very variable grain size (fine- to coarse- but mostly medium-grained), thin- to thick-bedded dolomite; horizontal; 20-foot high bluff with little to no chert; f: N25E, N5W, N75W, widely spaced in basal beds, closely spaced in middle and upper beds, some solution widening in middle beds

1350) Og fine- to medium-grained, thin- to thick-bedded dolomite; chert rare to absent, vuggy surface; horizontal; f: moderately spaced N60E and closely spaced N15W, solution widened

1351) Og fine- to medium-grained, thin- to medium-bedded, no chert; attitude N42E 6°NW (stream gradient follows dip); basal bed vuggy but others not; f: N50E, N20E, N80W, N80W set closely spaced and others moderately spaced,

1352) Og fine- to medium-grained, thin- to medium-bedded dolomite; no chert, vuggy; rolling beds but on average horizontal; very small caves 6" by 3" by 1-2' present on 10-foot high bluff; f: N75W, N20E, widely spaced at base, closely spaced in upper cave-bearing beds, lower part but upper part solution widened

1353) Og fine- to medium-grained, thin- to medium-bedded; vuggy, no chert; attitude N60E 3°NW; small overhanging shelter caves present (one about 3' deep by 9' wide by 2' high); f: N80W, moderately spaced, some solution widening

1354) Or thin-bedded, fine- to coarse-grained, poorly sorted quartz sandstone; subrounded to rounded grains; 4-foot high bluff; planar bedded except top bed has foreset beds dipping N40W; Or/Og at 990' elevation; f: N45W, N25E, widely spaced,

1355) Or oolitic chert interbedded with fine- to coarse-grained, poorly sorted, subangular to rounded quartz sandstone; horizontal; outcrop is bed of creek, bed about 2 feet thick; f: N80W, N10W, N55W, medium spaced, narrow,

1356) Or fine- to medium-grained, thin- to medium-bedded dolomite; mudcracks, vuggy; interbedded with chert, wavy stromatolites; horizontal; poorly exposed 20-foot high bluff; f: N10E and N20W closely spaced, N60W moderately spaced

1357) residuum; chert and sandstone rubble, some large cherty stromatolite heads and ripple marked sandstone blocks observed, all float, no outcrop, water still flowing in stream up to this point and beyond to out of sight

1358) residuum; chert and sandstone rubble, some large cherty stromatolite heads and ripple marked sandstone blocks observed, all float, no outcrop, no water flow in this gully section

1359) Og fine- to medium-grained dolomite; 3-foot thick bed of brecciated chert full of large stromatolites and cave voids 3" high by 1' wide by 1-2' long; horizontal; small waterfall over 3' thick dolomite bed, chert layer partly undercut beneath dolomite, water flowing; f: chert brecciated; dolomite N10E and N30W, moderately to widely spaced, solution widened

1360) Og thin- to medium-bedded, fine- to medium-grained dolomite, some chert blobs present; vuggy surface with small caves 3" high by 1' wide by 1-2' long; horizontal; f: N5W, N70W, moderately spaced, solution widened

1361) Og medium-grained, thin- to medium-bedded dolomite;, vuggy surface; f: NS closely spaced, also rare N35W fractures, solution widened

1362) Og chert, 4' thick outcrop about 10 feet above floodplain; f: randomly oriented

1363) colluvium/residuum; chert, float on bluff, no outcrop

1364) Og fine-grained, yellowish-brown, thin-bedded dolomite interbedded with thin white chert beds and scattered chert blobs from stream level to 12 feet up; 12-15 feet very cherty, top of bed at about 830 feet elevation; overlain by medium-grained dolomite; 5-foot thick massive ledge forming bed at base; overlain by poorly exposed rubble beds to about 30 feet up; overlain by medium-grained, medium- to thick-bedded dolomite with blobs and long anastomosing lenses of chert, often stromatolitic; horizontal;

OG/Oil at 830' elevation; f: N20E, N70W, moderately spaced, in most layers; in a few layers solution widened and with small caves 1' wide by 6" high by 2' deep, vuggy surfaces

1365) Og fine- to medium-grained, thin-bedded dolomite; includes a few lenses and blobs of chert, stromatolitic textures locally in both chert and dolomite; horizontal; f: N35W, N85W, N20E, moderately spaced,

1366) Og fine- to medium-grained, thin- to medium-bedded dolomite; interbedded with chert; horizontal; 5-foot high ledge about 20 feet above creek; f: N20E, N35W, closely spaced, solution widened

1367) Og fine- to medium-grained, thin-bedded dolomite; includes a few lenses and blobs of chert, stromatolitic textures locally in both chert and dolomite; horizontal; f: N10W, closely spaced, ; spring comes out of bluff about 20 feet up (same layer described in 1366).

1368) Og fine-grained, thin-bedded dolomite, a few chert stringers present; horizontal; f: N45W closely spaced, N5W medium spaced,

1369) Og fine-grained, thin-bedded dolomite, a few chert stringers present; horizontal; f: N15W closely spaced, N65E widely spaced, some solution widening

1370) Og fine- to medium-grained, medium-bedded dolomite with lenses of large stromatolites (now chert); horizontal; f: N65W moderately spaced, N15W closely spaced, solution widened

1371) dry stream bed, chert rubble, no outcrop, a few pools of water standing between localities 1370 and 1372

1372) Og chert, single thick bed exposed; horizontal; f: Pervasive random fracturing, one N30W set pretty well developed, closely spaced, depth indeterminate,

Thursday, 16 March 1995 Waynesville 7 1/2' quadrangle

1373) Quaternary terrace deposit exposed in bluff on bank of Smith Branch

1374) Og chert beds exposed on poorly exposed bluff, medium to

thick bedded; f: N20E, N30W, N65W, moderately spaced,

1375) Og chert beds exposed on poorly exposed bluff, medium to thick bedded; vuggy; f: N15E, N35W, plus numerous randomly oriented fractures, moderately spaced,

1376) zone of extensive landsliding, looks to be old

1377) Og excellent exposure, 70 foot high cliff, basal 6 feet fine- to medium-grained dolomite, thin bedded; overlain by medium- to coarse-grained dolomite, thick bedded to massive, locally cross bedded, attitude N70E 7°SE; anastomosing zones of brecciated chert 2-3 feet thick cross the lower cliff face (appears to be old filled and cemented cave system); large overhanging ledges and small caves on cliff face up to 3' X 3' X 3' in size; dolomite on face commonly vuggy; small spring emanates about 50 feet up cliff face; f: E-W, N45W, N40W 64°NE, N25W (forms bluff face), N10W, N35E 84°NW, N40E, N45E 66°SE, N60E 65°NW (wet and **through going**), N65E 60°NW (wet and **through going**), N65E, N70E 77°NW, N75E 57°NW (narrow but **through going**), N75E 54°SE (large wet **through going** fracture), N85E 77°NW (wet and **through going**); generally thin beds have closely spaced joints, medium beds have medium-spaced joints, and thick beds have widely spaced joints; some fractures but others cut the entire height of the cliff, solution widening common

1378) spring emanating from base of bluff, several gallons per minute of flow

1379) Og outcrop on stream bed at small waterfall; fine-grained, thin-bedded dolomite; about 5 feet exposed; small, broad synclinal fold visible with fold axis trending N35W and plunging 2 degrees southeast, SW limb strikes N22W and dips 13°E, NE limb strikes N49W and dips 12°SW; f: N40W (axial planar), N30-40E 64-90°NW, N15-20W 76-90°SW, medium spaced, solution widened

1380) Og fine- to medium-grained, thin- to medium-bedded dolomite; intricately fractured (mudcracks?); some layers have chert blobs; attitude N70W 18°SW, stream bed outcrop; f: N20E, N75W, moderately spaced, some solution widening

1381) Og fine- to medium-grained, thin-bedded dolomite; attitude N25E 9°NW; f: N65W, moderately spaced, no solution widening

1382) Og fine- to medium-grained, thin- to medium-bedded dolomite; more or less horizontal, 4 ft of section exposed; f: N35E (closely spaced), N20W (widely spaced), N55W (moderately spaced), N20W and N55W **through going** and with some solution widening, N35E not through going solution widening to wide

1383) Og fine- to medium-grained, thin- to medium-bedded; attitude N20E 8°NW; f: N30E, moderately to widely spaced, **through going**, solution widened

1384) Og fine- to medium-grained, thin- to medium-bedded dolomite; attitude N80E 4°SE; some chert blobs present; small caves; poor exposure on a large bluff; f: N50W (moderately to closely spaced), N35E (widely spaced), solution widened

1385) Og fine- to medium-grained dolomite; one thick bed exposed; more or less flat; f: N50E 72°NW, N20E, N85E 65°NW, moderately spaced, **through going**, solution widened

1386) Og chert; about three' thick; composed of big stromatolite heads up to 10' in diameter; overlain by about 6' of medium- to coarse-grained, medium- to thick-bedded; attitude N75W 6°SE; stream bed outcrop; f: N85E 70°NW, N75E, N65E 45°NW, N45E, N35E, N70W, moderately spaced, some **through going**, solution widened in dolomite

1387) Og poorly exposed rocky bluff, no readings attempted

1388) Og fine- to medium-grained, medium- to thick-bedded dolomite; attitude E-W 4°S; no chert apparent; small caves and vugs common on bluff face; about 15' exposed; f: N25W 78°NE, N85W, widely spaced, some **through going**, solution widened

1389) Og fine-grained, thin-bedded dolomite; thin beds of chert stromatolites interbedded; attitude N70W 3°NE; stream bank and stream bed exposure, about 6' exposed; good long outcrop; f: N65E (rare), N25E, N10W, N50W, all near vertical, closely spaced except N65E, some **through going**,

1390) Og Old quarry, much chert and dolomite scattered about, one bluff yielded an attitude of N25E 8°NW, no fractures noted or measured

3/17/95 Waynesville 7 ½' quadrangle

1391) Or medium-grained, poorly sorted, well-rounded but welded, medium-bedded sandstone; 2' exposed along gully wall; Or/Og at 960' elevation; f: N35E, N15-30W, N85W 73°SW, closely spaced, some **through going**,

1392) Og fine- to medium-grained, thin- to medium-bedded dolomite; no chert obvious; about 10' exposed; attitude N55W 3°SW; f: N30W, widely spaced, some solution widened

1393) Spring issuing from base of bluff, several gallons per minute of flow

1394) Landslides, very large, quite old

1395) Og fine- to medium-grained, thick-bedded dolomite; two beds full of chert interbedded with the dolomite; attitude N50E 6°NW; high bare bluff; 0-6 feet: dolomite; 6-12 feet: chert and dolomite interbedded, some chert represents stromatolites, small caves abundant up to 3' high by 2' wide by 8' long; 12-17 feet: massive dolomite; 17-21 feet: chert and dolomite, very cavernous, one overhang cave is about 30' wide by 10' deep by 3-4' high, small tubes go back farther; 21-30 feet: massive dolomite; One small cave goes N80E to out of sight (1' X 1' X ?), small crystals cover walls and ceiling, now dry and crumbly; f: N65E 80°SE, N25-35E 68-80°SE, N35W, N70W, moderately to widely spaced, mostly solution widened

1396) Og 70 foot high bare bluff; section same as at 1395; fewer caves than before but those present still concentrated in the cherty beds; f: One prominent **long deep fissure**, 10 feet wide, with a trend of N35E, also smaller fractures along N-S 66°E, N50W 80°NE (**through going**), N70-85W 75-90°N moderately to widely spaced, some through going, solution widened

1397) large landslide, quite old, large vertical trees growing on it

1398) more landsliding and slumping; a few high bluffs in places, not visited

1399) Og fine- to medium-grained, thin-bedded dolomite; ledge 7'

high forms waterfall; soft beds underhand ledge by up to 3', attitude N15E 6°NW; f: N25E 75°SE (closely spaced), N25W 80°NE (moderately spaced), N60W (one observed),

1400) Og medium-grained, thin- to medium-bedded dolomite; broad ledges exposed on creek floor, 6' section exposed; no obvious chert; attitude N30E 4°NW; f: N40E 55°NW, N5W, N50-70W 82-90°NE closely to moderately spaced, solution widened

1401) Og fine- to medium-grained dolomite and chert interbedded; thin layered but thick bedded; vuggy outcrop surface; attitude N60E 4°NW; f: N10E 75°SE, N50W 80°NE, N85W, moderately spaced, some solution widened but others not

1402) Og medium-grained dolomite; top of one bed exposed on small creek bottom ledge, bed thickness unknown; attitude N35E 8°NW; f: N25W, N50W, E-W, moderately spaced, fracture depth not determinable, some solution widening

1403) alluvial apron developed at mouth of gully

1404) Og fine- to medium-grained, thin-bedded dolomite; sparse chert present; attitude N60E 2°NW; f: N45-60E 76-85°SE, N20W, N45W, N80W, closely to moderately spaced, **through going**, extensive solution widening; several solution tubes 3-6' in diameter are exposed in stream bed, with flowstones on walls, connected by N15W fissure parallel to stream trend

1405) Og fine- to medium-grained, medium-bedded dolomite; attitude N35W 7°SW; f: N65W, N25W, moderately spaced, solution widened

1406) Or fine- to coarse-grained, poorly sorted, subrounded to well-rounded, thin- to medium-bedded quartz sandstone; attitude N45W 4°SW; f: N60E, N35E, N45W, moderately spaced, solution widened

1407) Or fine- to coarse-grained, poorly sorted, subrounded to rounded quartz sandstone; some foreset beds dip N30E (current direction); attitude N45W 4°SW; 3' bed exposed; Or/Og at 960' elevation; f: N45W, N5W, N55E, moderately spaced,

1408) Og fine- to medium-grained, medium-bedded dolomite; long low 10' high bluff exposes cross section of small anticline oriented

N58E and plunging 3°SW; NW limb has N25E 9°NW attitude, SE limb has E-W 7°S attitude; f: N30E 75°SE, N25W, E-W, widely spaced, some **through going** but others not, solution widened with vuggy borders

1409) Og long rubble-filled gully; only one small outcrop of dolomite with no joints visible

1410) Spring issuing from west bank of gully at about 1000' elevation

1411) alluvium; long bluff, about 15' high, exposing boulders in sand matrix

1412) Og fine-grained, thin-bedded, yellowish-brown dolomite containing blobs up to 2' in diameter of chert; capped by a thin chert bed with abundant stromatolite heads up to 3' in diameter; attitude N15E 4°NW; exposed at base of bluff on stream bed beneath alluvial overburden; f: Dolomite has N85E fractures, moderately spaced, ; chert has N75E, N30E, and N55W fractures, closely spaced,

1413) alluvial slump feature; failure planes at back not totally overgrown hence fairly recent; failure planes dip west toward creek

1414) another alluvial slump feature, much older and overgrown

1415) Og fine-grained dolomite; thinly laminated within thick bed; solution vugs and voids abundant; attitude N45E 3°NW, chert tubes abundant (burrows?); f: N20E 78°NW, E-W, closely spaced, **through going**, solution widened

1416) Og fine- to medium-grained, thick-bedded dolomite; horizontal; f: N70E 83°NW, N5E, N35W, N75W, closely spaced, **through going**, solution widened

1417) Og fine- to medium-grained, thick-bedded dolomite; horizontal; vuggy surfaces and small overhang caves about 6' wide by 4' deep by 1.5' high; f: N85E 78°NW, N20E 68°SE, widely spaced, solution widened

1418) Or fine- to coarse-grained, poorly sorted, thin- to medium-bedded; horizontal; water comes out of hidden spring about 20 feet

higher (appears to be same elevation as at 1410); Or/Og estimated to be about 980' elevation; f: N45E, N5E 82°NW, N50W, moderately spaced,

Saturday, 18 March 1995 Bloodland Quadrangle

1419) residuum/colluvium; float of very fine- to fine-grained, medium-bedded quartz sandstone; no outcrop but float present along hillside; some blocks contain trails and mudcracks

1420) Ojc very fine- to fine-grained, medium-bedded quartz sandstone; attitude N5E 5°NW; asymmetric ripple marks indicate current direction of N85E; f: N85E (widely spaced), N45E (closely spaced), N15W (moderately spaced), all **through going**,

1421) Ojc fine-grained, thin-bedded, horizontal; planar foreset beds dip N45W; symmetrical ripple elongated N65E; f: N75E (widely spaced), N45E (moderately to closely spaced), N15W (moderately spaced), **through going**,

1422) Ojc fine-grained, thin-bedded dolomite; attitude N70E 9°NW; 3' exposed; f: N80E, N25W, closely spaced, **through going**,

1423) residuum/colluvium; breccia fragments, round to angular clasts, silicified, no outcrop but scattered up along small gully

1424) Ojc fine-grained dolomite; thinly laminated but medium bedded; horizontal; some chert stromatolite heads present; vuggy surface, 10 foot high bluff on stream bank; f: N5-15W, widely spaced, **through going**, solution widened

1425) Ojc fine-grained, thin- to medium-bedded dolomite; horizontal; poorly exposed, no obvious fractures

Brownfield quadrangle

1426) Ojc fine-grained, thin- to medium-bedded; horizontal; one long ledge exposed; f: very sparse, one N5E, one N30W, one N70E, through going in part, some solution widening, vuggy sides

1427) Ojc fine- to medium-grained, thin- to medium-bedded dolomite; surface vuggy; horizontal; f: N70E, N70W, widely spaced, **through going**, solution widened

1428) Rubble zone, lots of quartzite from SE hillside and abundant evidence of talus and slumping

1429) Ojc quartzite; much of it with round to angular breccia; one broken up "bed" trends N40E 40°NW; abundant shearing visible

Bloodland quadrangle

1430) rubble in gully, lots of quartzite, much of it with breccia clasts

1431) Ojc fine-grained, thin-bedded dolomite; attitude N10E 15°SE; f: Pervasively fractured, closely spaced, some solution widening (but not much), mostly not through going except for **through going** N50E fracture

Sunday, 19 March 1995 Waynesville Quadrangle

1432) rubble gully, highest spring level is at 900' elevation, several gallons per minute of flow

1433) Og fine- to medium-grained, medium-bedded dolomite; attitude N35W 10°NE, vuggy weathered surface; f: N20W, moderately spaced, solution widened

1434) Og fine- to medium-grained, medium-bedded dolomite; attitude N5W 9°NE; vuggy surface to outcrop and small caves 3" high by 1' wide by 2' long present; large pod (1' by 6' by ?) of chert breccia present that looks like cemented cave fill; f: N75E, N20E, N35W, moderately spaced, **through going**, solution widened

1435) Og fine- to medium-grained, medium- to thick-bedded dolomite; vuggy surface to outcrop and very small caves common; horizontal; outcrop high on face of bluff; f: N85E, N25E, moderately spaced, **through going**, solution widened

1436) colluvium; chaotic rubble, mostly chert, exposed along long bluff

1437) Roubidoux Creek bed dry along here; no surface flow

1438) alluvium; sand, medium-brown, some lenses of chert gravel, much better sorted than colluvium on east side of creek

1439) Og mostly medium-grained, thick-bedded dolomite (but stromatolitic laminae give it a thinly banded appearance); some chert stromatolite beds about 1 foot thick are present; attitude N30E 7°SE; vuggy surface; small caves scattered about, exposed on a high bluff which has its base covered by alluvium; bluff mostly dry except for small seeps near base just above alluvium; f: N45E, N20W, N75W, moderately spaced, some through going but most not, solution widened

1440) Og fine-grained, thin- to medium-bedded dolomite; one 6" layer of chert stromatolite present; attitude N45E 4°NW; small outcrop on bank of Roubidoux Creek; no reliable fracture trends

1441) pond, bermed, not a sinkhole. Full of water but no surface outflow

1442) Og fine- to medium-grained, medium- to thick-bedded dolomite; horizontal; vuggy surfaces and small caves abundant; one stromatolite chert bed about 1' thick observed; 15' bluff mostly mossed and overgrown, but outcrop visible here and there; f: N10W, N75W, widely spaced, **through going**, solution widened

1443) landslide, large, appears to be quite old

1444) Og fine- to medium-grained dolomite, some medium but mostly thick bedded; horizontal; vuggy outcrop surface and a few small caves; scattered chert breccia lenses probably represent cemented cave fill; one large overhang cave near top (30' wide by 3' high by 10' deep) has water seepage from roof of cave; layers are rolling but on average about flat; bare bluff high above creek; f: N35E, N25W, widely spaced, extensively solution widened to wide

1445) Og fine-grained dolomite, one thick bed visible on gully floor; horizontal; f: N20E, N65W, widely spaced, depth indeterminable, some solution widening

1446) alluvium; alluvial fan built up at mouth of gully.

1447) Og fine- to medium-grained, thin- to thick-bedded dolomite; chert lenses scattered throughout; outcrop surface vuggy and small caves present; one overhang ledge; heavy seepage; outcrop approximately horizontal; f: N70E, N15E, N15W, widely spaced, solution widened

1448) Og fine- to medium-grained, thick-bedded dolomite; large bluff with big overhanging ledge;

1449) Og fine- to medium-grained, thick-bedded dolomite; horizontal; large cave (50' wide x 10' deep x 10' high) developed in a chert-rich zone, one small passage in back of cave goes back another 10 feet; one fallen block in cave has old flowstone on it; f: N40E, N75W, widely spaced, solution widened

1450) Og fine- to medium-grained, thick-bedded dolomite; horizontal; long bluff, upper half mostly bare rock but lower half covered by talus; vuggy outcrop surface with numerous small caves; no discernable fractures

1451) Og fine- to medium-grained, medium-bedded dolomite; horizontal; bluff on east gully bank; vuggy outcrop surface with numerous small caves and on big overhang cave 3' high x 40' wide x 10' deep; pervasive seepage; f: N80E, N20E, N60W, moderately spaced, solution widened

1452) Og mostly medium-grained, medium- to thick-bedded dolomite; horizontal; vuggy outcrop surface and small caves present; f: N75E, N20E, N55W, widely spaced, solution widened

1453) Og medium-grained, medium-bedded dolomite; horizontal; vuggy outcrop surface with ledges and a few small scattered caves; f: N5E, N60W, moderately spaced, solution widened

1454) Or very fine- to medium-grained, poorly sorted quartz sandstone; thin planar to ripply bedding; horizontal; water flows over this layer so groundwater exits above base of this unit; Or/Og at 960' elevation; f: N55E, NS, widely spaced, **through going**,

Monday, 20 March 1995 Waynesville 7 ½' quadrangle

1455) Or medium-grained, poorly sorted, thin-bedded quartz sandstone; horizontal; f: poorly developed and inconsistent

1456) same as 646); open karst collapse structure; approximately 20' diameter and 60-70 feet deep, sound of water emanating from north side of shaft in passage at base running off in that direction

1457) large sinkhole partly filled with cut trees

1458) Or massive, medium- to thick-bedded chert interbedded with medium-grained, poorly sorted sandstone; exposed in ditch; horizontal; f: E-W, N50E, N-S, N30W, closely spaced, **through going**

1459) Og medium-grained, thin- to medium-bedded dolomite; horizontal; f: N60W, N5E, moderately spaced, solution widened

1460) Og medium-grained, medium-bedded dolomite; horizontal; very vuggy outcrop surface, small outcrop; no fractures obvious

1461) rubble filled gully, no outcrop

1462) Og medium-grained, thin- to medium-bedded dolomite; horizontal; outcrop on roadside; surface vuggy; f: N60E, N20W, closely spaced, solution widened

1463) Og medium- to thick-bedded chert; horizontal, exposed on floor of gully; f: N50E, N20W, widely spaced, depth uncertain,

1464) long bluff, covered with colluvial rubble; no outcrops

1465) Og medium-grained, medium-bedded dolomite; horizontal; f: N20W, closely spaced, solution widened

1466) Og medium-grained dolomite; one thick bed exposed on stream bank; horizontal; vuggy surface; f: N30E, N40W, widely spaced, some solution widened but others not

1467) Og fine- to medium-grained, thin- to medium-bedded dolomite; horizontal; surface somewhat vuggy; f: N65E, N30E, N75W, moderately spaced, solution widened

1468) Og fine-grained, medium-bedded dolomite; horizontal; exposed on gully floor; f: N30E, N40W, closely spaced, **through going?**, solution widened

1469) Og fine-grained, thin- to medium-bedded dolomite; contains blobs of chert; horizontal; exposed on gully floor; f: N50E, N-S, N65W, closely to moderately spaced, some solution widened but others not

1470) Og medium-grained, thick-bedded dolomite; beds thinly banded; horizontal; vuggy surface; f: N70E, N10E, widely spaced, solution widened to moderately wide

1471) Or fine- to coarse-grained, poorly sorted, subrounded to rounded quartz sandstone; thin planar bedding; horizontal; one foot of sandstone overlain by one foot of fine-grained dolomite, overlain by two feet of sandstone; exposed on wall of gully; Or/Og at 950 feet elevation; f: N35E, N25W, moderately to widely spaced,

1472) Or fine- to coarse-grained, poorly sorted, subrounded to rounded quartz sandstone; thin planar bedding; horizontal; forms waterfall on floor of gully; Or/Og at 950 feet elevation; no fractures

1473) Or medium-bedded chert and fine- to coarse-grained, thin-bedded quartz sandstone; horizontal; Or/Og at 950' elevation; f: N20W, N40W, widely spaced,

1474) Og fine- to medium-grained, thick-bedded dolomite; beds thinly laminated; horizontal; f: N45E, N20W, moderately to widely spaced, some solution widened but others not

1475) Og fine- to medium-grained, medium-bedded; horizontal; surface vuggy; f: N60E, N30E, N85W, closely to moderately spaced, solution widened

1476) Og fine- to medium-grained, thin- to medium-bedded dolomite; horizontal; surface vuggy; f: N40E, N35W, N80W, moderately spaced, solution widened

1477) residuum/colluvium; no outcrop, lots of rubble

1478) Og medium-grained, medium-bedded dolomite; horizontal; surface very vuggy; f: N60E, N25E, N5W, moderately to closely spaced, **through going**, solution widened

1479) Og fine- to medium-grained, thin- to thick-bedded dolomite; horizontal; 8 foot high bluff located 20' up slope, forms overhanging ledge and small cave running back from base of outcrop; f: N10W, N85W, widely spaced, solution widened

1480) Or very fine- to medium-grained, poorly sorted, subrounded to rounded quartz sandstone; horizontal; top of bed exposed on gully floor; Or/Og at 950' elevation; f: none visible

1481) Or very fine- to medium-grained, poorly sorted, thin-bedded quartz sandstone; horizontal; one foot bed exposed on gully floor; f: N10W, moderately spaced,

1482) no outcrop, rubble filled gully.

1483) Og fine- to medium-grained, medium- to thick-bedded dolomite; horizontal; sporadic outcrop; vuggy surface where exposed; f: N60E, N15E, widely spaced, solution widened

1484) no outcrop, rubble filled gully

1485) Og fine- to medium-grained, thick-bedded dolomite; bedding thinly laminated; horizontal;, lenses of chert interspersed; surface very vuggy; 6' of poor exposure; f: N85E, N50E, widely spaced, **through going**, solution widened

1486) Og fine- to medium-grained, medium- to thick-bedded dolomite; 1-2' layers of chert interbedded which include small to medium sized caves, one cave trends along N75W fracture, walls have small dry flowstones; a second small cave trends on a N5W fracture; a third cave with a few stalactites on ceiling forms a U-shaped loop into and out of the cliff face (3' wide by 2-8' high by 40' long); a fourth big cave on a N10E trend (facing S10W) is 40' wide by 10' high at front and goes into cliff at least 140'; horizontal; surface vuggy; high bluff with bare cliff in upper half and lower half covered by talus; f: N65E, N45E, N25E, N15W, N85W, widely spaced, some **through going** but others not, solution widened

1487) high bluff, mostly covered, a few small high outcrops not visited

1488) high bluff, bottom half covered by talus and top half bare, not visited

1489) Og fine- to medium-grained dolomite interbedded with chert, both thin to medium bedded, basal bed a 2' bed of stromatolitic chert, flat lying; bank of Roubidoux Creek; overlies fine-grained, thin-bedded, yellowish-brown dolomite; OG/Oil at 830' elevation; f:

(All in Upper Gasconade) N80E, N-S, moderately spaced, dolomite fractures solution widened, but chert fractures;

1490) Og medium-grained, medium-bedded dolomite; horizontal; on floor of gully; f: N50E, N60W, moderately spaced, solution widened

1491) Or very fine- to medium-grained, poorly sorted, rounded quartz sandstone; horizontal; 2' thick ledge with no fractures; Or/Og at 950' elevation

1492) Or chert, stromatolitic textured, brecciated; f: abundant, but randomly oriented.

Tuesday, 21 March 1995 Waynesville 7 1/2' quadrangle

1493) long covered bluff; covered by rubble, mostly talus but maybe some terrace development as well

1494) Og medium-grained, thin- to medium-bedded dolomite; horizontal; vuggy outcrop surface; spring issues from base of bluff with about 1 gallon per minute of flow; f: N55E, N10E, N25W, closely to moderately spaced, **through going**, solution widened

1495) Og fine- to medium-grained, thin- to medium-bedded dolomite; horizontal; vuggy outcrop surface; outcrop on gully floor; f: N60E, N15E, N20W, widely spaced, solution widened

1496) Og medium-grained, medium- to thick-bedded dolomite; horizontal; poorly exposed bluff; f: N20-35E, N15W, N45W, moderately spaced, solution widened

1497) Og mostly medium-grained, thick-bedded dolomite interbedded with much rarer layers of stromatolitic chert; horizontal; chimney protrude upward through talus slope; some small caves present in stromatolitic chert beds; f: N35-55E, N5W, moderately spaced, **through going**, solution widened

1498) Og chert; 1' thick bed exposed on bluff wall; horizontal; vuggy surface and small caves abundant; no fractures

1499) Og fine- to medium-grained, medium- to thick-bedded dolomite interbedded with chert; vuggy; some small caves present; horizontal; f: N45E, N5E, N40W, moderately spaced, **through going**,

solution widened

1500) Og medium-grained, thin- to thick-bedded dolomite; horizontal; some horizons 1-3' thick are cherty and have abundant caves; thick beds form ledges and thinner beds form underhangs; high bluff with upper two thirds bare and the lower third covered by talus; f: N20E, N20W, N85W, closely spaced (thin beds) to moderately spaced (medium to thick beds), solution widened

1501) Og another high bluff like 1500); same units present; f: N80E, N20W, N40W, widely spaced,

1502) alluvial fan; built up on flood plain at mouth of side gully

1503) Og fine- to medium-grained, thin- to medium-bedded dolomite; horizontal; 3' high outcrop on gully bank; f: N10E, N45W, closely to moderately spaced,

1504) Og fine- to medium-grained, thick-bedded dolomite; beds thinly laminated; horizontal; vuggy surface; f: N15E, N5W, N60-85W, closely to moderately spaced, solution widened

1505) Og fine- to medium-grained dolomite; one thick bed, top exposed on gully floor; horizontal; f: N15E, N10W, N65W, widely spaced,

1506) Og fine- to medium-grained, medium- to thick-bedded dolomite interbedded with beds 1-3' thick of interlayered stromatolitic chert and dolomite; horizontal; vuggy surface and small to medium sized caves present (mostly in cherty horizons); one cave is about 3' wide by 1' high by 30' long along a N5E trend, cave walls have dry veneer of crystal growth and a few small stalactites; bare cliff located high on bluff above talus slope; f: N70E, N25E, N20W, moderately to widely spaced, some **through going** and others not, some solution widened and others not

1507) alluvial fans, developed at the mouths of two adjacent gullies

1508) Og fine-grained, thin to medium bedded dolomite interbedded with chert; horizontal; vuggy surface; f: N80E, N40E, N55W, moderately spaced, **through going**, solution widened

1509) bed of Roubidoux Creek totally dry through this area.

1510) Og fine-grained dolomite and chert interlayered; horizontal; small exposure 4' thick in a long bluff that is mostly covered; f: N40E, N35-50W, moderately spaced, **through going**, solution widened

1511) Og 3' of stromatolitic chert overlain by 2' of thin-bedded fine- to medium-grained dolomite; horizontal; f: N20-40E, N20W, N75W, closely spaced, some through going and some not,

1512) Og medium-grained, medium- to thick-bedded dolomite; horizontal; f: N40E, N50W, moderately spaced, solution widened

1513) Og fine- to medium-grained, medium-bedded dolomite; 4' ledge on side of gully; vuggy surface and small caves present; f: N50E, N30W, N85W, widely spaced, solution widened

1514) Or/Og contact

Or fine- to medium-grained, poorly sorted, thin-bedded quartz sandstone

Og fine- to medium-grained, thin- to medium-bedded dolomite; vuggy surface and a few small caves present; horizontal; f: N50E, N10E, N40W, closely spaced, solution widened in dolomite but not in sandstone

1515) Or very fine- to medium-grained, poorly sorted, subrounded to rounded, thin-bedded quartz sandstone; horizontal; f: N60E, N20W, N85W, moderately spaced, through going,

1516) Or fine- to medium-grained, thin- to thick-bedded dolomite; horizontal; f: N45E, N75W, moderately spaced, **through going**, solution widened

1517) Or fine- to medium-grained dolomite; one thick bed exposed with water falling over it, knobbly and vuggy surface; horizontal; f: N20E, widely spaced, solution widened

Wednesday, 22 March 1995 Waynesville 7 ½' quadrangle

1518) Og fine- to medium-grained, thick-bedded dolomite; horizontal; f: N35E, N5W, N45W, N65-80W, closely to moderately spaced, **through going**,

1519) Og fine- to medium-grained, thick bedded dolomite; horizontal; f: N5W, N30E, widely spaced, solution widened

1520) Og fine- to medium-grained, thick-bedded dolomite; vuggy surface; horizontal; f: N55E, EW, widely spaced, solution widened

1521) Og fine- to medium-grained, medium- to thick-bedded dolomite; horizontal; vuggy surface and small caves abundant; one long cave (3' high by 3' wide by 10' long) faces out toward N85W); f: N60E, N35W, N85W, widely spaced, solution widened

1522) Og fine- to medium-grained, medium-bedded dolomite; horizontal; vuggy surface; f: N45-65E, N5E, N45W, N75W, moderately spaced, **through going**, solution widened

1523) Or very fine- to medium-grained, poorly sorted, thin-bedded quartz sandstone; overlying 6' of Upper Gasconade fine- to medium-grained dolomite with vuggy to knobbly surface; horizontal; Or/Og at about 990' elevation; f: N85E, N55E, N35W, N75W, widely spaced, solution widened

1524) large area with no outcrop

1525) Or? chert, stromatolitic, single thick bed exposed; horizontal; f: N65E, EW, N45W, closely spaced,

1526) large area with no outcrop

1527) Or very fine- to medium-grained, poorly sorted, dolomitic, thin- to medium-bedded sandstone; vuggy surface; thin cherty layers interbedded; horizontal; f: N60E, N25E, N5W, N30W, closely spaced, solution widened

1528) Or very fine- to medium-grained, dolomitic sandstone and quartzite; knobbly surface, one thick bed exposed on gully floor; horizontal; pool of water ponded on this surface in one area; f: N85E, N55-70E, N5W, N70W, widely spaced,

1529) large area with no outcrop

1530) Or fine-grained dolomite interbedded with very fine- to medium-grained, poorly sorted, thin- to thick-bedded sandstone; vuggy surface; east end of outcrop flat lying but west end gently

rolls to west; f: N85E, N5E, moderately spaced, solution widened

1531) Or fine- to medium-grained, thin- to medium-bedded orthoquartzite overlying Upper Gasconade dolomite, fine- to medium-grained, thick bedded, with small caves; horizontal; Or/Og at 990' elevation; f: N5E, N70W, widely spaced, solution widened in the dolomite

1532) Og fine- to medium-grained, medium- to thick-bedded dolomite; vuggy and with small ledges and caves; horizontal; f: N25E, N70E 71°NW, moderately spaced, **through going**, solution widened

1533) Og fine- to medium-grained, thin- to medium-bedded dolomite; scattered blobs and long lenses of chert; horizontal; f: N55E, N5E, N25W, N80W, moderately spaced, some solution widened and others not

1534) talus slope, no outcrop

1535) Og fine- to medium-grained, thin- to medium-bedded dolomite; some thin chert lenses present; horizontal; outcrop in road; f: N75E, N35E, N25W, N65W, moderately spaced, solution widened

1536) Or fine- to coarse-grained, thin-bedded orthoquartzite; horizontal; f: N40E, N55W, widely spaced,

1537) Og fine- to medium-grained, thin- to medium-bedded dolomite; some thin chert lenses present; horizontal; outcrop on side of road; f: N85E, N50E, N25E, N20W, moderately spaced,

1538) two landslides, quite old with big trees growing on them

1539) Og fine- to medium-grained, thick-bedded dolomite; vuggy surface; horizontal; rock cliff on upper third of bluff, lower two-thirds covered in talus; some chimneys present; f: N50E, N5E, N30W, moderately to widely spaced, solution widened

1540) Og fine- to medium-grained, medium- to thick-bedded dolomite; horizontal; f: N25-40E, N30W, N60W, closely to moderately spaced, solution widened

1541) Og fine- to medium-grained, medium- to thick-bedded dolomite; horizontal; at east end of outcrop is one cherty bed with small

caves; f: N45E, E-W, N15W, N65W, closely to moderately spaced, solution widened

1542) Og fine- to medium-grained, thick-bedded dolomite; horizontal; f: N35E, N-S to N20W, N65W, closely to moderately spaced, **through going**, solution widened

1543) Og fine- to medium-grained, medium- to thick-bedded dolomite; vuggy surface with small caves and one big cave, flat lying; big cave faces S40E, entrance 30' wide by 2' high by 15' deep, floor mostly buried by sand and pebbles, cool air and loud gurgling sound of water emanate from small hole in back; located on bluff 20-30' high; f: N35W, N75W, widely spaced, solution widened

Thursday, 23 March 1995 Waynesville 7 1/2' quadrangle

1544) long gully full of chert rubble but no outcrops

1545) Og chert, vuggy, one thick bed exposed; horizontal; f: N35E, moderately spaced

1546) landslide, old and overgrown

1547) Og fine- to medium-grained dolomite and medium- to thick-bedded chert; horizontal; small moss covered outcrop located high on bluff face; f: N35E, N15W, N40W, closely spaced, **through going**, solution widened

1548) Or basal sandstone bed exposed on gully wall; Or/Og about 990' elevation (hand leveled)

1549) Or basal sandstone bed on gully floor and adjacent low gully wall; Or/Og about 950' elevation

4/4/95 Bloodland 7 ½' quadrangle

1550) karst collapse structure

1551) residuum and loess; brown, silty clay; fragments of cryptocrystalline chert, fine-grained sandstone, and orthoquartzite (some brecciated); Ojcr

1552) similar to above

1553) residuum fragments of cryptocrystalline chert, orthoquartzite, and fine-grained dolomite; Ojcr

1554) large karst collapse structure; many large trees growing in it

1555) Or thick-bedded to massive, fine- to medium-grained quartz sandstone and orthoquartzite; some cross bedding; outcrop in wall of karst collapse structure 25-30 ft in diameter; horizontal bedding; f: widely spaced, well developed N45W, N85E, and N15E

1556) karst collapse structure ~120 ft in diameter and 25 ft deep; possibly open; wall of Or thick-bedded to massive, fine- to medium-grained quartz sandstone; f: medium- to widely spaced, well developed N45-60W, N10-15E, and E-W

1557) karst collapse structure; 25-30 ft in diameter; open?; wall of Or sandstone on north side; horizontal; f: widely spaced, well developed N45-50E, N60W, and N80E

1558) residuum/colluvium large float boulders of Or sandstone

Big Piney 7 ½' quadrangle

1559) Or medium- to fine-grained quartz sandstone; E-W 21°N; f: wide- to medium-spaced N75-80E 70-75°SE and N20W 55-80°SE

1560) Or same rock as above; E-W 5-8°N; f: wide- to medium-spaced N55-60E, N20W, and N55-60W

1561) Or same rock as above with lenses of orthoquartzite; N60W 37°NE; f: widely spaced N-S, N80W, and N70W 75°SW

Bloodland 7 ½' quadrangle

1562) residuum dark-red clay; fragments of cryptocrystalline chert and dry bone chert

1563) Ojc fine-grained, well-sorted quartz sandstone; ,1.5-2 ft thick bed; basically flat with undulations; asymmetrical ripples marks towards S20W, symmetrical ripple marks elongated N20E; f: medium-spaced, well-developed N70-75E and N10E, moderately wide

1564) Ojc medium- to thin-bedded, fine-grained dolomite and sandy dolomite; N70E 4°SE; f: widely spaced N65W, N30E, and N10W, mild solution widening

1565) Ojc thin-bedded mudstone; very small outcrop; horizontal; f: closely spaced N70W and N5E

1566) Ojc Quarry Ledge; small outcrop; N70W 8°SW; no fractures

1567) pond in karst structure?

1568) colluvium/residuum; Ojc float

1569) residuum wide area recently cleared; reddish-brown clay; fragments of chert and sandstone; Ojcr

1570) similar to above

1571) Ojc pseudo-outcrop? of fine-grained quartz sandstone; no reliable structural data

1572) residuum yellowish-brown clay; fragments of cryptocrystalline chert and sandstone; Ojcr

1573) residuum reddish-brown clay; fragments of cryptocrystalline chert, dry bone chert, and abundant fine-grained, well-sorted quartz sandstone; Ojcr

1574) Ojc Quarry Ledge?; thin- to medium-bedded, fine- to medium-grained dolomite; horizontal; f: medium-spaced N85E and N10W, slight solution widening

1575) residuum boulders of Or sandstone

1576) karst collapse structure

1577) Quaternary loess; brown silt

1578) Quaternary loess overlying residuum of Ojc; chert fragments

1579) residuum

1580) Quaternary loess (1-1.5 ft thick) overlying residuum of Ojc

containing fragments of chert, chert breccia, sandstone, and orthoquartzite

1581) Ojc fine-grained quartz sandstone; horizontal; f: medium-spaced, well- developed N75E and N15W

1582) residuum large boulders of Ojc sandstone, fine-grained with chert fragments

1583) residuum reddish-brown clay; fragments of chert and sandstone

1584) residuum Ojcr; boulders of fine-grained quartz sandstone

1585) similar to above

1586) residuum fragments of Or sandstone and chert

1587) residuum boulders of Ojc fine-grained sandstone

1588) similar to above

1589) Ojc thin- to very thin-bedded, fine-grained, well-sorted quartz sandstone; asymmetrical ripple marks towards N55W and N40-45W; desiccation cracks; N-S 5-7°; f: widely spaced, poorly developed N75W

1590) Ojc Quarry Ledge; horizontal; no discernable fractures

Big Piney 7 ½' quadrangle

1591) Or massive, medium-grained quartz sandstone; low-angle undulating dips; f: widely spaced N60E

1592) Or thick-bedded, medium-grained quartz sandstone; N80E 5° NW; f: medium-spaced N5-10W and N80E

1593) Or same rock as above; horizontal; f: medium-spaced N10W and N80E

1594) Or medium- to thick-bedded, medium-grained quartz sandstone; low-angle undulating dips; f: medium- to widely spaced N-S to N10E and N75E

1595) Og thick- to thin-bedded, medium-grained dolomite; horizontal; f: poorly developed and inconsistent

1596) Og stromatolitic chert; f: poorly developed and inconsistent

1597) Og 40 ft bluff of massive medium- to coarse-grained dolomite, intraformational breccia, and stromatolitic chert; overlain by Or sandstone at top of bluff; scattered solution cavities and small caves; horizontal; f: poorly developed N10W and N75E

1598) Og massive to thick-bedded, medium-grained dolomite; N25E 5°SE; numerous solution cavities; small cave 6 ft diameter opening, S10E for ~15 ft then filled; f: medium- to widely spaced N35W and N60E

1599) Og massive to thick-bedded, medium-grained dolomite overlain by stromatolitic chert (weathered to dry bone); numerous solution cavities in dolomite; 6 ft interval of seepage; horizontal; f: poorly developed medium-spaced N10W, N45E, and N45W in dolomite; medium-spaced N40W and N60E in chert

1600) paleokarst?; Or sandstone float

1601) Og stromatolitic chert; porcelaneous; no discernable fractures

1602) Og similar to above

1603) Og massive, fine- to medium-grained dolomite overlain by stromatolitic chert; no discernable fractures

1604) residuum/colluvium boulders of Or quartz sandstone; chaotic steep dips

1605) Or thin- to medium-bedded, medium- to coarse-grained quartz sandstone; lenses of orthoquartzite; horizontal; f: **through going** medium- to widely spaced N10E, N75E, and N40W

1606) karst collapse structure

1607) same as above

1608) Or small outcrop of sandstone in road bottom; no reliable

structural data

1609) small karst collapse structure; ~25-30 ft in diameter; ~6 ft deep

1610) residuum fragments of stromatolitic chert

1611) small karst collapse structure; 25-30 ft in diameter, ~4 ft deep

Bloodland 7 ½' quadrangle

1612) residuum float boulders of stromatolitic chert

1613) residuum fragments of sandy chert and sandstone

1614) residuum/colluvium sandstone float

1615) residuum/colluvium stromatolitic chert float

1616) karst collapse structure

1617) Or small outcrop of sandstone in road bottom; no reliable structural data

1618) similar to above

1619) residuum/colluvium sandstone and chert float

1620) Or small outcrop of fine- to medium-grained quartz sandstone in road bottom; N20E 8ºSE; f: medium-spaced N10W and N75-80E

1621) Quaternary loess (1-2 ft) overlying residuum with fragments of sandstone and chert

1622) Or questionable outcrop of sandstone in road bottom; no reliable structural data

1623)residuum sparse chert float

1624) similar to above

1625) residuum in recently cleared area; overlain by loess?

1626) similar to above

4/5/95 Big Piney 7 ½' quadrangle

1627) Quaternary loess overlying residuum

1628) Or massive to thick-bedded, medium-grained quartz sandstone; horizontal; f: widely spaced, poorly developed N10W to N-S and N75-80W, many healed

1629) Or same rock as above; N45W 4-5°SW; f: wide- to medium-spaced, poorly developed N-S and N75W, most healed

1630) Or questionable outcrop of sandstone in road bottom; no reliable structural data

1631) similar to above

1632) colluvium/residuum float boulders of Or sandstone

1633) Og stromatolitic chert; horizontal; f: numerous, but disorganized

1634) Og stromatolitic chert; basically horizontal; f: **through going** medium- to widely spaced N-S to N10E and N45-50E, moderately wide

1635) Miller Spring, no outcrops

1636) Og massive, medium-grained dolomite and intraformational breccia; small caves in breccia; horizontal; f: poorly developed, medium-spaced N-S, N40W and N35E

1637) Og thick-bedded, medium- to coarse-grained dolomite and intraformational breccia; ~35 ft bluff; several solution cavities and small caves, esp. low in outcrop; horizontal; f: medium-spaced N30E and N65-70W, many solution widened

1638) Og medium-bedded, medium-grained dolomite; horizontal; numerous solution cavities; f: medium-spaced N20W and N35-40E, moderately wide

1639) two karst collapse structures in hillside; >100 ft in

diameter; approximately on Or/Og contact

1640) Og thick- to medium-bedded, medium- to coarse-grained dolomite; damp and dripping seepage; horizontal; f: poorly developed, widely spaced N35W

1641) karst collapse structure; ~20 ft above 1640); ~50 in diameter

1642) Og massive, medium-grained dolomite; several solution cavities; horizontal; f: poorly developed and inconsistent

1643) Quaternary terrace 4-6 ft above present

1644) Og thick-bedded, medium-grained dolomite; numerous solution cavities along bedding planes; horizontal; f: **through going** medium-spaced N-S to N20W and N60E

1545) Og thick- to thin-bedded, medium- to coarse-grained dolomite; dripping seepage; horizontal; f: widely spaced N75W and N30E

1646) Og stromatolitic chert and dolomite; horizontal; f: medium-spaced N40W and N45E

1647) Og thick-bedded, medium-grained dolomite; several solution cavities; horizontal; f: medium-spaced N20W and N65E, solution widened, moderately wide

1648) Og thick- to thin-bedded, medium- to coarse-grained dolomite and intraformational breccia; numerous solution cavities and small caves esp. along bedding in breccia horizons; small spring issuing several gal/m from one cave ~15 ft above Creek level; horizontal; f: poorly developed, medium-spaced in some beds N-S, N30E, and N60E

1649) karst collapse structure in hillside; 80-100 ft in diameter

1650) Og thick-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: wide- to medium-spaced N70E and N10E

1651) Og thick- to medium-bedded, medium- to coarse-grained dolomite; several 2-3 ft high ledges crop out for ~40 ft uphill, then Or sandstone float; numerous solution cavities; horizontal; f: medium- to widely spaced N10-15E, N40W, and N60E

1652) karst collapse structure 60-80 ft in diameter

1653) Og thick- to medium-bedded, medium-grained dolomite; numerous solution cavities; undulating dips <10°; f: medium-spaced N65E, N25W, and E-W, several wide

1654) Og thick-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: widely spaced N40E and E-W

1655) Or thin-bedded, fine- to medium-grained, poorly sorted quartz sandstone; horizontal; f: widely spaced N30E and N70W

1656) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities; N30E 10°NW; f: one **through going** N-S, elsewhere medium- to closely spaced N80E and E-W

1657) karst collapse structure; 60-80 ft in diameter

1658) Quaternary terrace 6-8 ft above present

1659) Og thick- to medium-bedded, medium-grained dolomite; numerous solution cavities; small pool of standing water; horizontal; f: medium- to closely spaced N85W and N-S, solution widened, moderately wide

1660) Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities and small caves; possible collapsed large cave, 10 ft in diameter; horizontal; f: poorly developed, widely spaced N45-50E and N45W

1661) Og thick- to thin-bedded, medium-grained dolomite; numerous solution cavities and small caves; horizontal; f: poorly developed, medium-spaced N60E and N70W

1662) karst collapse structure; 80-100 ft in diameter

1663) Og ragged exposure of leached dolomite and residuum overlying dolomite in creek bottom; horizontal; f: poorly developed N-S and N25W

1664) Quaternary terrace 6-8 ft above present

1665) Og small outcrop of massive, medium-grained dolomite in creek

bottom; horizontal; f: poorly developed and inconsistent

1666) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N45E and N40W

1667) Og thin- to medium-bedded, medium- to coarse-grained dolomite, no sand; Or sandstone float ~25 ft uphill numerous solution cavities; horizontal; f: widely spaced N5-15E and E-W

1668) Or thin-bedded quartz sandstone and sandstone/orthoquartzite breccia; sandstone beds show undulating dips <10°; breccia along N30E trend?; this outcrop is at same elevation as 1667); possible small fault or dipping Or/Og contact

1669) karst collapse structure; 100-120 ft in diameter; making small amount of water; Or sandstone on south side, N80W 55-75°NE

1670) Or stromatolitic chert; f: medium- to closely spaced N75-80W

1671) Og small outcrop of massive dolomite in creek bottom; no reliable structural data

1672) Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; Or/Og contact at ~1040 ft elevation; broad anticline with limbs <10°; f: medium-spaced N25W and N60W

1673) Or same rock as 1672); N80W 20°NE; f: medium- to closely spaced N-S, N40W, and N60E

1674) Og thick-bedded, medium-grained dolomite; numerous solution cavities; spring issuing from small cave tens gal/m; horizontal; f: medium-spaced N40E and N65W

1675) karst collapse structure 100-120 ft in diameter

1676) Og 6 ft water fall into karst pool ~ 12-15 ft in diameter; medium-bedded, medium-grained dolomite and intraformational breccia; dripping seepage; f: medium-spaced N-S and N40W

1677) Og medium-bedded, medium-grained dolomite; several solution cavities; dripping seepage; f: very poorly developed and inconsistent

1678) similar to above

Bloodland 7 ½' quadrangle

1679) residuum boulders of fine-grained, well-sorted sandstone; Ojcr

1680) Ojc top of Quarry Ledge; horizontal; f: widely spaced, well-developed, N75-80W and minor N35W

1681) Ojc quarried area
6-10 ft Quarry Ledge Member

~12 ft thin- to medium-bedded, fine-grained dolomite with white chert nodules and stromatolitic chert

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~6 ft poorly exposed, thin-bedded, fine-grained dolomite

~10 ft finely laminated, medium- to thin-bedded, fine-grained dolomite with thin stromatolitic beds and <1 in. white and gray chert lenses; f: poorly developed N85W and N10-15W in floor, stromatolitic dolomite and chert; desiccation cracks

1682) Or? massive, fine- to medium-grained, craggy dolomite; f: poorly developed and inconsistent

1683) Ojc fine-grained, well-sorted quartz sandstone; N30W 10°NE; f: medium-spaced N65W, N35E, and N70E

1684) Ojc Quarry Ledge Member; horizontal; no fractures

1685) Ojc very thin-bedded, fine-grained dolomite; minor stromatolitic beds; f: numerous, but disorganized

1686) Or medium- to thin-bedded, fine- to medium-grained, poorly sorted quartz sandstone and orthoquartzite; desiccation cracks; horizontal; f: numerous polygonal

1687) similar to above

1688) Ojc fine-grained, well-sorted quartz sandstone; small outcrop in road bottom; no reliable data

1689) Ojc stromatolitic chert in road bottom

1690) residuum float boulders of Ojc sandstone

4/6/95 Bloodland 7 1/2' quadrangle

1691) Or small outcrop in road bottom; medium-bedded, fine- to coarse-grained quartz sandstone; granules concentrated on thin surfaces; symmetrical ripple marks elongated N55E; N70E 5-10°SE; f: wide- to medium-spaced N20W and N60E

1692) Or small outcrop of stromatolitic chert; f: several, but inconsistent orientations

1693) Or
6-10 ft stromatolitic chert

10-15 ft thin- to medium-bedded, fine- to medium-grained quartz sandstone; desiccation cracks; f: widely spaced N60E and N50W
~20 ft thick-bedded, medium-grained dolomite; numerous solution cavities; f: poorly developed N-S to N5W and N85W

1694) Or chert breccia and stromatolitic chert; f: wide- to medium-spaced N35E

1695) Or medium-bedded, fine- to medium-grained quartz sandstone; desiccation cracks; basically horizontal; f: widely spaced N45E and N50W

1696) Quaternary terrace 3-4 ft above present

1697) Or/Og 2-3 ft of sandstone overlying medium- to coarse-grained dolomite with numerous solution cavities in creek bottom; horizontal; f: in Og, medium-spaced N55W and widely spaced N45E

1698) Or stromatolitic chert; f: widely spaced N25E, N40W, and N65W

1699) karst collapse structure?

1700) Or stromatolitic chert; horizontal; f: medium-spaced N40E and N45W

1701)Or thick-bedded, fine- to medium-grained quartz sandstone; numerous marble-sized concretionary balls; large blocks slabbing off into creek; f: widely spaced N25W and N55E

1702) Quaternary terrace; 5-6 ft above present

1703) Or thick-bedded, fine- to medium-grained quartz sandstone; concretionary balls; horizontal; f: widely spaced N20E, N30W, and N75W

1704) Or small outcrop of medium-bedded quartz sandstone; f: widely spaced N20E and N60W

1705) Or medium- to thin-bedded quartz sandstone; horizontal; f: widely spaced N20W, N75-80W, and N30E

1706) Or small outcrop of dolomite in creek bottom, common solution cavities; basically horizontal; f: medium- to closely spaced N20E and N80W

1707) Or thin- to medium-bedded, medium-grained quartz sandstone; desiccation cracks; horizontal; f: medium-spaced N45E, N70-80W, and N10E

1708) Or 3 ft of dolomite with many small solution features overlain by 3 ft of fine- to medium-grained sandstone and 3 ft of stromatolitic chert; bedding N55W 5SW; f: (in dolomite) medium spaced N50E, N80W; (in sandstone) widely spaced N20E, N50W

1709) Or
6 ft stromatolitic chert

3-4 ft medium- to thin-bedded, fine- to medium-grained quartz sandstone; f: medium-spaced N5W and N50-60E

2-3 ft medium-grained dolomite, no sand; numerous solution cavities; f: poorly developed, medium-spaced N25W and E-W

10-15 ft covered interval
3-4 ft very sandy dolomite; f: widely spaced N40E and N70W

1710) Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; f: widely spaced N80W and N10E to N-S

1711) Or 6+ ft thick- to thin-bedded, medium-grained dolomite, no sand overlying fine- to medium-grained quartz sandstone; numerous solution cavities; horizontal; f: poorly developed, widely spaced N75W and N20E

1712) residuum/colluvium; sandstone and chert float

1713) Or stromatolitic chert; small outcrop; no reliable structural data

1714) Or thin-bedded quartz sandstone overlying medium-bedded, medium-grained dolomite; numerous solution cavities and small caves as much as 1 ft in diameter and 12 ft deep at sandstone-dolomite contact; horizontal; f: widely spaced N60E and N20W

1715) Or medium-bedded quartz sandstone overlying medium-bedded dolomite with numerous solution cavities; dripping seepage; horizontal; f: in sandstone, widely spaced N-S to N10E, N60-70W, and N40E

1716) Or stromatolitic chert and chert breccia; horizontal; f: inconsistant

1717) karst collapse structure; ~100 ft in diameter

1718) Og? thick-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: poorly developed, widely spaced N70-80W and N10-15E

1719) Og dense, gray chert in creek bottom; horizontal; f: medium- to closely spaced N-S, E-W, N15W, and N35E

1720) Og medium- to thin-bedded to massive, medium-grained dolomite, no sand; numerous solution cavities and small caves, honeycombed; f: poorly developed, widely spaced N15E and N65W

1721) Og similar to above

1722) Og thick-bedded to massive, medium-grained dolomite; numerous solution cavities; horizontal; f: medium-spaced N80W to E-W and widely spaced N-S

1723) Og

3 ft medium-bedded, coarse-grained dolomite; porous; very few solution cavities; damp seepage; horizontal; f: well-developed, medium-spaced N10E and E-W

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3 ft stromatolitic chert and dolomite; f: very poorly developed and inconsistent

1724) Og medium-bedded, coarse- to medium-grained dolomite; numerous solution cavities; horizontal; f: poorly developed, medium-spaced N70W and N40E

1725) Og stromatolitic chert; 6-8 ft thick; f: medium- to closely spaced N5-15W, N55E, N75W, and N45-50W

1726) Or stromatolitic chert and chert breccia in road bottom; no reliable structural data

1727) Quaternary loess; ~1 ft overlying residuum

Brownsfield 7 ½' quadrangle

1728) residuum/colluvium brown clay; fragments of Or chert and sandstone

1729) residuum large boulders of drusy chert

1730) Ojc stromatolitic chert in road bottom; no reliable structural data

4/7/95 Bloodland 7 ½' quadrangle

1731) Or fine- to medium-grained, poorly sorted quartz sandstone; small outcrop in road bottom; basically horizontal; f: closely spaced N65E and N50W

1732) Or medium- to thick-bedded, fine- to medium-grained quartz sandstone; symmetrical ripple marks elongated N40W, asymmetrical ripple marks towards N65-75E; abundant green algae in water; horizontal; f: wide- to medium-spaced N55E and N5W

1733) Or massive to thick-bedded, poorly sorted quartz sandstone; basically horizontal; f: widely spaced N15-30W and N55W, mostly healed

1734) Or same rock as above; large concretions 3-4 ft in diameter, fractures break around; heavy seepage from above data point; asymmetrical ripple marks towards S40W; water fall 15-20ft high with slabbed overhang 15-20 ft deep; natural bridge; f: well-developed, wide- to medium-spaced N-S to N10E, mostly healed

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sandstone overlies thin- to very thin-bedded dolomite, chert, orthoquartzite, and sandstone; symmetrical ripple marks elongated N35E and N55E; f: medium- to widely spaced N10W and N55E

1735) Or same sandstone as above; horizontal; asymmetrical ripple marks towards S45E and S75E; desiccation cracks; 10 ft ledge overhang and waterfall; f: medium- to widely spaced N-S $\pm$ 10° and N60E, most are closed

1736) Or thin-bedded, fine- to coarse-grained quartz sandstone, thin intervals of white chert granules; f: widely spaced N-S

1737) Or same rock as above; horizontal; f: wide to medium spaced N-S $\pm$ 10° and N70-75E, most are closed

1738) Or same rock as above; horizontal; f: widely spaced N-S and N75E

1739) Or same rock as above; horizontal; f: wide- to medium-spaced N20W and N75E

1740) small spring issuing from Quaternary terrace ~ 3-4 ft above present; few gal/m; abundant algae growth

1741) Or fine- to medium-grained quartz sandstone; horizontal; f: wide- to medium-spaced N-S and N80W

1742) Or similar to above

1743) Or same rock as above; horizontal; f: wide- to medium-spaced N10E and N50W

1744) Or thin-bedded stromatolitic chert and dolomite; beneath ledge-forming sandstone; horizontal; f: none discernable

1745) Quaternary terrace ~6 ft above present

1746) Or massive quartz sandstone, 25-40 ft uphill; underlain by 12-15 ft of stromatolitic chert; f: in sandstone, widely spaced N-S

1747) Or thin-bedded stromatolitic dolomite and massive stromatolitic chert; dripping seepage from dolomite; horizontal; f: poorly developed and inconsistent

1748) Or medium- to thin-bedded quartz sandstone and orthoquartzite; horizontal; dripping seepage; f: poorly developed and inconsistent

1749) Or below 1748); 4-5 ft of medium- to thin-bedded dolomite with floating quartz grains; dripping seepage; several solution cavities; f: poorly developed and inconsistent

1750) karst collapse structure?; shallow depression 100-120 ft in diameter, 5-6 ft deep

1751) Or thin-bedded, sandy dolomite in creek bottom; damp and dripping seepage from surrounding alluvium; horizontal; f: medium-spaced N65E and N15-20W

1752) Or thin-bedded dolomite (no sand) and stromatolitic chert; horizontal; f: medium-spaced N-S to N10E and N65W

1753) Or fine-grained dolomite (no sand) in creek bottom; rare solution cavities; horizontal; f: widely spaced zones of closely spaced N75E, closed

1754) Quaternary terrace 4-8 ft above present

1755) Og massive, medium-grained dolomite in creek bottom; numerous solution cavities; horizontal; f: widely spaced **through going** N80W

1756) small spring; few gal/m issuing from thin-bedded stromatolitic dolomite in lower Or, just above Og contact; bedding at N35W 10°NE

1757) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal with low undulations; f: medium- to widely spaced N20E

1758) Quaternary terrace ~6 ft above present

1759) Og outcrop in creek bottom; thick-bedded, medium-grained dolomite; numerous solution cavities; horizontal; f: very poorly developed and inconsistent

1760) small outcrop in creek bottom; medium-grained dolomite; f: medium-spaced N15W and N60E

1761) Quaternary terrace 5-8 ft above present

1762) Or stromatolitic dolomite and chert; no fractures

1763) Og thick-bedded to massive, medium-grained dolomite; several solution cavities; dripping seepage; f: poorly developed N60W and N10E

1764) Or medium-bedded, fine- to medium-grained quartz sandstone; dripping seepage; horizontal; f: poorly developed N35W and N40E

1765) Og medium- to thick-bedded, medium-grained dolomite; horizontal; f: poorly developed and inconsistent

1766) Or/Og contact at 990; dripping seepage at contact
Or medium- to thin-bedded quartz sandstone; f: poorly developed N-S

Og massive, medium-grained dolomite; numerous solution cavities; f: poorly developed and inconsistent

1767) Or stromatolitic chert and medium-bedded, quartz sandstone and orthoquartzite; horizontal; f: medium- to widely spaced N25W and N75E

Bloodland 7 1/2' quadrangle

1768) Or fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N35W and N30E

1769) Or massive, ledge-forming quartz sandstone; horizontal; f: widely spaced N-S and N80W

1770) same as above, on opposite side of draw

1771) Or massive to thick-bedded fine- to medium-grained quartz

sandstone; N60E 3-5ºNW; f: medium- to widely spaced N60E and N15W

1772) spring area; tens of gal/m of stream flow issuing from broad surface area

Big Piney 7 1/2' quadrangle

1773) Og thick-bedded to massive, medium-grained dolomite; numerous solution cavities; dripping seepage; horizontal; f: poorly developed and widely spaced N20W and N60E

1774) Og same rock as above; dripping seepage; f: widely spaced N25E and N60W

1775) karst depression in hillside

1776) same as above

1777) Quaternary terrace ~6-8 ft above present

1778) Og medium- to thin-bedded, medium-grained dolomite; dripping seepage; horizontal; f: poorly developed and medium-spaced N60W and N25E

1779) spring; few hundred gal/m issuing out of bank; no outcrop

Bloodland 7 1/2' quadrangle

1780) Quaternary loess, < 3 ft thick

4/8/95 Bloodland 7 1/2' quadrangle, Cannon Range

1781) residuum/colluvium; float boulders of Or sandstone

1782) same as above

1783) same as above

1784) Or very thin-bedded stromatolitic chert and fine-grained dolomite; horizontal; f: poorly developed and inconsistent

1785) Or massive to thick-bedded, fine- to medium-grained, poorly sorted quartz sandstone; horizontal; f: widely spaced N15E and N75W

1786) residuum/colluvium; float boulders of Or sandstone

1787) same as above

1788) Or medium- to thin-bedded orthoquartzite, sandstone, and stromatolitic chert; minor secondary blue-green clay; horizontal; f: well-developed and medium-spaced N45W and N65E in sandstone and orthoquartzite, none in chert

1789) residuum/colluvium; float of Or sandstone and chert

1790) residuum/colluvium; large boulders of Or sandstone

1791) Or thick-bedded, fine- to coarse-grained quartz sandstone; N50-60W 4-6°SW; f: widely spaced N65-75W and N-S to N10E, most are closed

1792) residuum; sandy and oolitic chert, and sandstone float

1793) same as above

1794) Ojc thick-bedded chert breccia; small outcrop in road ditch; Fe-oxides; f: one at N65W 75°NE

1795) Ojc thick-bedded, fine-grained, well-sorted quartz sandstone and chert breccia; small outcrop? in road ditch; f: one at N60W 85°NE; cataclastic shears at N65E, closed

1796) Ojc Quarry Ledge; horizontal; f: wide- to medium-spaced, poorly developed E-W and N40E

1797) Ojc Quarry Ledge; massive, fine-grained dolomite, cotton rock; no fractures; same location as 1069)

1798) Ojc fine-grained dolomite with white, tubular chert; small outcrop in road ditch; f: widely spaced N15W and N75W

Roby 7 ½' quadrangle

1799) Or medium- to thick-bedded quartz sandstone; f: wide- to medium-spaced N65E and N55-60W

1800) Or/Og contact at 975 ft

Or same as 1799)

Og thick-bedded, medium-grained dolomite; numerous solution cavities; f: widely spaced N65W and N20-25E

1801) Or thin-bedded, fine- to medium-grained, poorly sorted quartz sandstone; horizontal; f: widely spaced N40W and N60E

1802) Or/Og contact
Or thin-bedded quartz sandstone; horizontal; f: widely spaced, poorly developed N45W and N55-60E

Og thick-bedded, medium- to coarse-grained dolomite; numerous solution cavities and small caves; dripping and damp seepage; horizontal; f: poorly developed and widely spaced N60E and N45-50W

1803) small spring issuing from cave in Og just above creek level; few gal/m

1804) Or/Og contact at 980 ft; 40-60 ft bluff face; horizontal; f: in Og, poorly developed and inconsistent

1805) cave; ~ 4 ft in diameter at Or/Og contact in bluff face

1806) karst collapse structure; talus-filled cone in bluff ~50 ft high

1807) Quaternary terrace; 12-15 ft above present

1808) Or fine- to medium-grained quartz sandstone; thin intervals of white chert granules; questionable outcrop; no reliable structural data; definitely Or @ this point

4/10/95 Bloodland 7 ½' quadrangle

1809) Or 10 ft of massive quartz sandstone and orthoquartzite overlying 6-10 ft of stromatolitic chert; horizontal; f: in sandstone and orthoquartzite, medium- to closely spaced N5-15W and N75E

1810) Or stromatolitic chert overlying 4 ft of medium-grained dolomite; numerous solution cavities; horizontal; f: in dolomite,

medium-spaced N60E and N-S

1811) Or medium- to thin-bedded, fine- to coarse-grained quartz sandstone; cross bedded; horizontal with minor undulations; f: widely spaced, well-developed N20W and N60-65E

1812) similar to above

1813) Or massive to thick-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced, well-developed N-S, N30W and N65E

1814) **Faulted monocline**; ~20 ft of down-to-southwest offset; approximate N60-65W strike; structure defined by prominent sandstone bed of 1813)

1815) Or southwest side of fault; Or medium- to thin-bedded, poorly sorted sandstone; horizontal with minor undulations; dripping and damp seepage; f: overall wide- to medium-spaced with zones of closely spaced N20W, N65W, and N45-55E

- small **thrust fault**, striated slickenside surface N10W 35°SW, raking 90°
- slightly larger **thrust fault** along bedding, with ramps at N20-25E 20° NW, slickenside striations with S75W direction
- chatter marks on horizontal surface indicate motion towards S35W
- N15-20W vertical fractures with secondary mineralization and ? horizontal slickenside striations
- above observations indicate left-lateral strike-slip movement on N60-65W structure

1816) Or similar rocks to above; f: widely spaced N15W, N40W, and N65E

1817) Or thick-bedded, fine-grained quartz sandstone; damp seepage; solutioning along bedding planes and fractures; ledge overhang 8-10 ft deep; small natural arch; horizontal; f: widely spaced N20-25W

1818) Quaternary terrace; 6-8 ft above present

1819) colluvium/residuum; sandstone and chert float

1820) small spring; ~1 gal/m issuing from bank; no outcrops

1821) Or stromatolitic chert; f medium-spaced N40W and N60E

1822) Or medium- to thin-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N45W and N40E

1823) Or massive sandstone; horizontal; f: widely spaced N20-25W and N60E

1824) Or massive sandstone; f: widely spaced N25W and N60E

1825) numerous sandstone float boulders containing cataclastic shears in creek bottom; no outcrop of this material

1826) Or fine- to medium-grained quartz sandstone and orthoquartzite; N40W 20°SW; f: medium- to widely spaced, well-developed N25-30W and N70E; minor brecciation along N70E fractures

1827) Or massive to thick-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N75E and N15W

1828) Or same rock as above; horizontal; f: poorly developed, widely spaced N10W and N70E

1829) Quaternary terrace; fan-shaped high terrace

1830) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: medium-spaced N15-20W and N70E

1831) small spring; few gal/m issuing out of bank; no outcrop

1832) Or massive fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N25W and N65-70E

1833) Quaternary terrace; ~10 ft above present

1834) Or massive to thick-bedded, fine- to medium-grained quartz sandstone; N35W 10°SW; f: widely spaced N25-30W and N60E

1835) Or same rock as above; horizontal; f: widely spaced N35W and N55E

1836) Or stromatolitic chert and quartz sandstone; horizontal; f: poorly developed and inconsistent

1837) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N40W and N60E

1838) Or medium-grained dolomite; irregular chert nodules; moss-covered outcrop; f: widely spaced N-S and N60E

1839) Or

12-15 ft of thin- to medium-bedded, medium-grained sandy dolomite; dripping seepage; f: poorly developed, medium-spaced N60-65E and N15-20W

6-8 in. stromatolitic chert; no fractures

6-8 in. clean, well-sorted, fine-grained quartz sandstone

2+ ft stromatolitic chert and dolomite in creek bottom; f: poorly developed and inconsistent

1840) Or same horizon and rock as above; horizontal; f: poorly developed, medium-spaced N10-15W

1841) Or thick-bedded, medium-grained quartz sandstone; horizontal; f: medium- to widely spaced N80E, N-S, and N40W

1842) Or massive, fine- to medium-grained quartz sandstone; large-scale through crossbeds; f: medium- to widely spaced N10-20W, most are closed

1843) Or same rock as above; symmetrical ripple marks elongated N25W; f: medium- to closely spaced N15-20W and N70E

1844) Or same rock as above; overlain by stromatolitic chert; f: poorly developed and inconsistent

1845) Or medium-bedded, fine- to medium-grained quartz sandstone; slightly oolitic; small outcrop; horizontal; f: inconsitant

1846) Or massive, poorly sorted, fine- to medium-grained quartz sandstone; basically horizontal with undulating surfaces; f: medium-spaced N5-10W, N70W, and N80E

1847) Or massive to thick-bedded, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced, poorly developed N80W and N50-55E

1848) Or 6-8 ft of stromatolitic chert overlying thin-bedded, medium-grained dolomite; horizontal; f: widely spaced and poorly developed N45E

1849) Or thick-bedded, fine- to medium-grained quartz sandstone; basically horizontal with undulations; f: medium- to widely spaced, well-developed N15-20W and N65-70E

Bloodland 7 ½' quadrangle

1850) Or medium- to thick-bedded, fine- to medium-grained quartz sandstone; large-scale trough crossbeds; f: widely spaced, well-developed N10-15W and N80E

1851) Or same rock as above; slight northerly dip; f: widely spaced N15-20W

1852) Or stromatolitic chert in creek bottom; slight northerly dip; f: poorly developed and inconsistent

1853) Or massive to thick-bedded, poorly sorted, fine- to medium-grained quartz sandstone; slight northerly dip; cross bedded; f: well-developed, medium- to widely spaced N15-20W and N65-70E

1854) Or similar rock to above; large-scale trough crossbeds dipping northerly; spring issuing few tens gal/m with small pool and small minnows; f: **through going** N20-25W

1855) Or similar rock to above; E-W troughs; f: wide- to medium-spaced N15-20W, closed

1856) Or intercalated stromatolitic chert, quartz sandstone, and dolomite; horizontal; f: poorly developed and inconsistent

Roby 7 ½' quadrangle

1857) Or thick- to medium-bedded, medium-grained quartz sandstone; horizontal; f: wide- to medium-spaced N40E and N45W

1858) Or massive, poorly sorted, fine- to medium-grained quartz sandstone; basically horizontal with undulating surfaces; asymmetrical ripple marks towards N35E; f: widely spaced N-S and N40W, most are closed

1859) Or same rock as above; f: well-developed, wide- to medium-spaced N20W and N65-70E

1860) Or same rock as above; f: well-developed, wide- to medium-spaced N20W and N70E

1861) Or thin-bedded, poorly sorted, fine- to medium-grained quartz sandstone; small outcrop in road ditch; no reliable structural data

1862) Or stromatolitic chert overlain by thin-bedded quartz sandstone; f: closely spaced N35E, N-S, and N45W

1863) Or massive, fine- to medium-grained quartz sandstone; horizontal; f: widely spaced N-S and N40E

1864) Or thin-bedded, fine- to coarse-grained, poorly sorted quartz sandstone; thin intervals with white chert granules; horizontal with undulating surfaces; f: wide- to medium-spaced N20-30E and N65W

1865) residuum very minor chert float

1866) residuum/colluvium; chert and well-sorted, fine-grained quartz sandstone float; Ojcr

1867) residuum; very minor chert float

1868) residuum; chert and fine-grained, well-sorted quartz sandstone float; Ojcr

1869) residuum float boulders of fine-grained, well-sorted quartz sandstone with white chert nodules; Ojcr

1870) Ojc Quarry Ledge; minor seepage; f: poorly developed, widely spaced N10E to N15W

1871) Ojc medium-bedded, well-sorted, fine-grained quartz sandstone overlying stromatolitic chert; N70W 12°NE; symmetrical ripple marks

elongated N80E; f: medium-spaced N-S to N5W and N80-85W

1872) Or stromatolitic chert and thin-bedded, fine-grained quartz sandstone; f: poorly developed and inconsistent

4/11/95 Roby 7 ½' quadrangle

1873) Ojc Quarry Ledge at 1190 ft elevation; horizontal; f: widely spaced N85E

Slabtown 7 ½' quadrangle

1874) Or poorly sorted quartz sandstone in road bottom at 1230 ft elevation; no reliable structural data

Roby 7 1/2' quadrangle

1875) residuum; float of chert and chert breccia

1876) Ojc Quarry Ledge in road ditch; horizontal; no fractures

1877) Ojc Quarry Ledge; small outcrop; no reliable structural data

1878) Ojc fine-grained, well-sorted quartz sandstone in road ditch; horizontal; f: inconsistant

1879) residuum; Ojc sandstone and chert float

1880) similar to above

1881) Ojc thin-bedded, fine-grained dolomite in road ditch; horizontal; f: numerous, but inconsistent

1882) residuum; Ojc chert and sandstone float

4/12/95 Bloodland 7 ½' quadrangle

1883) Or stromatolitic chert and interbedded medium-bedded, medium-grained dolomite; horizontal; f: poorly developed and inconsistent

1884) residuum; float boulders of Ojc Quarry Ledge

1885) residuum; float of fine-grained, well-sorted quartz sandstone

and orthoquartzite

1886) Ojc thin-bedded, buff-colored, fine-grained dolomite overlying Quarry Ledge; N45W 4°SW; f: widely spaced N70-75E and N40-45W

1887) Or stromatolitic chert, poorly sorted quartz sandstone, and sandy dolomite; horizontal; f: poorly developed and inconsistent overall with zones of closely spaced N25-30W

1888) similar to above

1889) Ojc Quarry Ledge; numerous solution cavities; horizontal; f: widely spaced and irregular N30E, N-S, and N70E

1890) Or medium-bedded, medium-grained dolomite and minor stromatolitic chert; several solution cavities and small caves 2-3 ft in diameter; horizontal; f: widely spaced N60-65E and N35W

1891) colluvium/residuum; sandstone and chert float

1892) Or small outcrop of stromatolitic chert in road cut; no reliable structural data

1893) Or medium-bedded, fine- to medium-grained quartz sandstone and orthoquartzite; basically horizontal; desiccation cracks; f: medium- to closely spaced N25W and N65-75E

1894) Or similar rock to above; f: closely spaced N20W and N65-75E

1895) Or sandy chert; f: poorly developed, medium-spaced N5E

1896) Or sandy, oolitic chert; horizontal; f: poorly developed and widely spaced N25W

1897) Or fine- to medium-grained quartz sandstone and stromatolitic chert; f: poorly developed, medium-spaced N45W and N55-60E

1898) Or interbedded medium-bedded dolomite, sandstone, and stromatolitic chert; several solution cavities in dolomite; dripping seepage (rained hard the previous day); f: wide- to medium-spaced N25W and N75E

1899) residuum/colluvium; chert and Ojc sandstone float

1900) Or medium- to thin-bedded, medium-grained dolomite overlying stromatolitic chert; no sand; horizontal to N45E 4°SE; numerous solution cavities in some beds; f: medium to widely spaced N55E, N85W, and N10W

1901) Or thin-bedded, medium-grained dolomite; horizontal; f: poorly developed, medium-spaced N35W and N75E

1902) Or thin-bedded sandy chert and medium-bedded, medium-grained dolomite with no sand; numerous solution cavities in dolomite; horizontal; f: poorly developed and inconsistent

April 6, 1995 Bloodland 7 ½' quadrangle

1903) Qal terrace level 5-6 feet above stream bed

1904) Or fine- to medium-grained, poorly sorted, light-brownish-gray sandstone in stream bed; f: widely spaced N80W, N10E

1905) Or fine- to medium-grained, poorly sorted sandstone slumped on hillside; 2-ft diameter soil pipe in Qal directly below slumped sandstone

1906) Og massive, medium-grained, light-gray dolomite with solution features; bedding is horizontal; f: widely spaced N80W, N-S

1907) Qal two terrace levels noted; one 4-5 ft above stream bed, the other about 10 ft above stream bed

1908) Large sandstone slabs slumped down to level of Qal

1909) Or light-gray, stromatolitic chert overlain by fine- to medium-grained, poorly sorted sandstone; probably slumped; Og-Or contact at about 950 ft or above

April 7, 1995 Bloodland 7 1/2' quadrangle

1910) Thin, probably less than 1 foot thick, light-brown loess over brown residuum with small chert fragments

1911) Light-brown, silty residuum with fist-size chert float

1912) Reddish-brown residuum with small chert fragments

1913) Or fine-grained, light-gray dolomite with small vugs; damp seeps from bedding planes (dry period); bedding is horizontal; f: medium spaced N-S, E-W

1914) Og stromatolitic chert with vuggy, medium-grained dolomite in massive outcrop; gastropod fossil in chert; f: widely spaced N-S, N40E; medium spaced N60E

1915) Qal well sorted, fine-grained sand

1916) Large (4 ft by 15 ft) block of stromatolitic chert slumped on hillside

1917) Og vuggy, stromatolitic chert at approx. 900 ft elevation; f: medium spaced N50E, N40W

1918) Og medium-grained, light-gray dolomite with small solution features; bedding N75E 3SE; f: medium to closely spaced N45W, closely spaced N30E

1919) Og three foot thick bed of medium-grained dolomite with solution features; f: medium spaced N-S, N70E

1920) Or Berry Cave; cave opening in 7 ft of dolomite; dolomite overlain by (ascending) 2.5 ft of sandstone, 2 ft of dolomite, and 5 ft of sandstone; outcrop and cave entrance sits on one side of sinkhole that is 15 ft in diameter, 2 ft deep on down-slope side, and 20 ft deep on uphill side; many sandstone blocks litter west side of outcrop; with sunlight reflected off of brunton mirror, can see into cave entrance about 20 to 30 ft; lots of breakdown can be observed and cave seems fairly dry; bedding N80E 7SE; f: widely spaced N10W, some through going; medium spaced N75W

1921) Or medium- to coarse-grained, poorly sorted sandstone; f: widely spaced N60E, medium to widely spaced N10W

1922) Or thick-bedded dolomite overlain by 1 ft sandstone bed; damp seeps; horizontal; f: widely spaced N60W, medium spaced N50E

1923) Qal 3 ft thick stream deposit in hollow; thickens to 6-7 ft down stream

1924) Og 4 ft thick stromatolitic chert overlain by 20 ft of massive dolomite in large bluff; f: medium spaced N10E, N60W

1925) Fist-size chert float

1926) Fist-size and larger chert float

1927) Small sinkhole, 10 ft diameter, 2 ft deep

1928) Sandstone and chert float up to 2 ft square

1929) float same as above

1930) Og medium-grained dolomite with solution features; f: widely spaced N60E (not well defined), N60W

1931) Qal highest deposit in hollow; 2 to 3 ft thick

1932) Og medium-grained, light gray dolomite; large (5 ft cubed) stromatolitic chert float on top of outcrop; f: widely spaced N70W; medium spaced N-S

1933) Sandstone and chert float

1934) Qal can recognize at least three terrace levels on Roubidoux Creek

1935) Og 3 ft of light-gray, stromatolitic chert; several possible small (5 ft diameter) sinkholes on terrace deposit; f: widely spaced (not well defined) N30E, N10W

1936) Og thick-bedded, medium-grained dolomite with solution features; f: medium spaced N60E, N30W

1937) Og massive, 25 ft bluff of dolomite; bedding horizontal; f: widely spaced N20E; medium spaced N75E, N40W

1938) Og massive, medium-grained dolomite with many solution features; f: medium spaced N80W, N60W 65NE; closely spaced N-S

1939) Og highly weathered chert outcrop in stream bank; this is the only place where water is presnet in creek bed of this hollow (dry period); f: closely spaced N20-30E, N80E, N60W

1940) Og sequence of medium-grained dolomite ledges in stream bed with small waterfalls (during dry period); stream drops 7 ft over 25 ft distance and 3 ledges; this is uppermost Qal deposit in this hollow; bedding horizontal; f: medium spaced N10W (some closed), N55E, N80E

1941) Og ledge after ledge of dolomite in stream bed with ponds and sinks where water flow drops subsurface and appears again in seeps at next ledge (dry period); green algae in ponds; on hillside above these outcrops occur many large sandstone and chert blocks

1942) Og thick-bedded, medium-grained dolomite with small solution features; damp seeps (dry period); bedding N50E 5SE; f: widely spaced N50E; medium spaced N60W

1943) Or medium-grained, poorly sorted sandstone in 8 ft thick bed; this is 50 ft above 1942; f: medium to widely spaced N10W, N80W

1944) Or medium-grained, poorly sorted sandstone

1945) Or? dolomite pavement outcrop in stream bed with seeps; immediately upstream have sandstone outcrop in stream bank; probably Og-Or contact; f: closely spaced N-S, N55E, N80W

1946) Bowl-shaped karst depression on hillside

1947) Large blocks of chert and sandstone float

1948) Qal in Hurd Hollow

1949) Fist-size chert and sandstone float on hillside

1950) Og medium-grained dolomite with solution features; f: medium-spaced N65E, N30W

1951) Og 4 ft of stromatolitic chert overlain by 2 ft of dolomite and 5 ft of chert; fractures measured from dolomite; f: widely spaced N80E; closely spaced N10W

1952) Og dolomite with solution features; bedding horizontal; f: widely spaced N80E; medium spaced N-S

1953) Or (ascending) 3 ft of stromatolitic chert, 2 ft of sandy dolomite, 4 ft of sandstone; fractures measured from sandstone; horizontal; f: widely spaced N10E, N70E; medium spaced N10W

1954) Fist-size and larger sandstone and chert float

1955) Boulders of chert

1956) Or fine- to medium-grained, poorly sorted sandstone in 3 ft bed in stream bed; f: widely spaced N40E, N80W; medium spaced N30W

1957) Og thick-bedded, medium-grained dolomite with solution features in stream bed; f: widely spaced N10W; medium spaced N30E, N80W

1958) Qal small deposit where two drainages meet; does not continue down stream

1959) Qal starts up again below 1958

1960) Og 7 ft of massive dolomite with large (up to 3 ft diameter) solution cavities that extend as much as 6 ft into outcrop; f: medium spaced N75E; closely spaced N20W

1961) Og massive dolomite in large bluff; f: widely spaced N30E, N70E, N80W

1962) Og massive dolomite with solution cavities; f: widely spaced N-S, N70E

1963) Og stromatolitic chert outcrop in Hurd Hollow dry stream bed (dry period); well defined algal heads; f: closely spaced N-S, N60E, N50W

1964) Og medium-grained dolomite in stream bed; bedding horizontal; f: closely spaced N-S, N40E, N80W

1965) Possible sinkhole in dry stream bed, 3.5-4 ft deep

1966) Og stromatolitic chert in dry stream bed; f: closely spaced N-S, N80W

1967) three extremely well defined terraces in stream channel at 3,

4, and 6 ft above stream bed

1968) Og stromatolitic chert in dry stream bed; f: widely spaced N60W; medium spaced N20E, N10W

1969) Og dolomite in dry stream bed (dry period); seems to be caving into a sinkhole, 12 ft in diameter; f: medium spaced N20E, closely spaced N70W

1970) Fist-size to boulder-size chert and sandstone float

April 8, 1995 Bloodland 7 1/2' quadrangle

1971) Or medium-grained, poorly sorted sandstone; symmetrical ripples trend N50W; bedding N60E 12°SE; f: medium spaced N30E, N50W

1972) Or 7 ft of thick-bedded, fine- to medium-grained, poorly sorted sandstone with anastomosing ripples; bedding N82E 5SE; f: widely spaced N-S, N65E

1973) Fist-size sandstone and chert float; no outcrop on this hillside

1974) Thick sandy and cherty soil on hillside down near creek up to 18 ft above flood plain (exposed by road cut); this deposit has a gentler slope than the upper part of the hillside where there are large (up to 3 ft square) sandstone float and much large unexploded ordinance

1975) Or thick-bedded, medium-grained sandstone; f: widely spaced N70E, N10W

1976) Large sandstone boulders in small drainage

1977) A few large sandstone float blocks

1978) Or medium- to thick-bedded, medium-grained, light-brownish gray sandstone; f: widely spaced N-S, N75E

1979) Or thick-bedded, medium-grained sandstone; f: widely spaced N-S, N80W

1980) Or same as above; f: widely spaced N-S, N70E

1981) Sandstone float up to 3 ft square on hillside

1982) Large sandstone float blocks in hollow

1983) Same as above

1984) Fist-size sandstone and some chert float

1985) Or medium-grained, poorly sorted sandstone in road bed; bedding horizontal; f: widely spaced N5E, N25W; medium spaced N60E

1986) Or fine- to medium-grained, thick-bedded sandstone in stream bed with flowing water (dry period); water contains yellowish-green and rust colored algae and a white foamy substance; f: widely spaced N10E, N50E, N30W

1987) No water above this point in stream bed

1988) Light-brown, cherty residuum with sandstone float and possibly a thin loess cover

1989) Same as above

Roby 7 ½' quadrangle

1990) Or sandstone in stream bed; symmetrical ripples trend N15E; water in stream contains some yellowish-green algae, white foamy substance, and large ordinance; may be a spring area-water line on rocks and rust level of unexploded ordinance looks constant; bedding is horizontal; f: widely spaced N10-20E, N40E, N15W

1991) Or medium-bedded, medium-grained sandstone with two sets of asymmetrical ripples; one ripple set has flow direction on N60E, the other has a flow direction of N10W; fair amount of water in stream (dry period); no algae, but some white foamy stuff; fish in stream; bedding N-S 10W; f: medium to closely spaced N10-15E, N40W

1992) Sandstone of Or as float on hillside

1993) Light-brown residuum with no rock float

1994) Light-brown, silty residuum with chert and sandstone fragments

1995) Or medium-bedded sandstone; f: widely spaced (poorly developed) N30E, N65E, N10W

1996) Light-brown, silty and cherty residuum with sandstone fragments

1997) Or medium-grained, poorly sorted sandstone with some beds containing mudcracks in gully below dam; this lake is feeding stream at 1991; bedding is horizontal; f: widely spaced N70E, N30W

1998) Ojc quarry ledge, fine-grained dolomite; Or-Ojc contact tentatively placed at 1130 ft elevation; f: widely spaced and poorly developed N80E, N20W

1999) Ojc quarry ledge, possibly top of quarry ledge

2000) Brown residuum with little float; flat area corresponding to beds above the quarry ledge

2001) Ojc top of quarry ledge in pavement outcrop at 1180 ft elevation; no discernable fractures

2002) Ojc thin-bedded dolomite; f: widely spaced N30E; closely spaced N70W

2003) Ojc chert breccia in slightly slumped outcrop

2004) Same as above

2005) Ojc thin-bedded dolomite with no discernable fractures

2006) Sandstone float up to 2 ft square

2007) Brown, iron-stained chert float up to fist size

2008) Or medium-gray, oolitic chert overlain by friable sandstone; f: widely spaced N30W, N80E; medium spaced N30E

2009) Or stromatolitic chert in gully in road

2010) Alluvial terrace 5 ft above Qal

2011) Sandstone blocks up to 2 ft square blocking hollow

2012) Or sandstone ledge

2013) Og thick-bedded, medium-grained dolomite with large solution cavities and small cave; some damp seeps near base of outcrop (dry period); a small stream is wet up to and several feet above the Og-Or contact (at 970 ft elevation); a good section through the contact is found in this stream draw; small cave entrance is 1 ft high and 4 ft wide and trends N50E and slightly downward; horizontal; f: widely spaced N80E, N10W

2014) Or sandstone ledge above meander in Roubidoux Creek; f: widely spaced and poorly defined N-S, N80E

2015) Og massive dolomite in bluff; large cavities exist at river level and several feet above; many seeps and water drips all over bluff (dry period); large cavity areas exist at 0, 10 and 15 ft above Roubidoux Creek level; only one through going fracture observed on entire large, massive outcrop trending approx. N40E

2016) Ojc quarry ledge just below road; many puddles and seeps along road during this very dry period

2017) Ojc quarry ledge; f: widely spaced and poorly developed N-S, N40W

2018) Ojc thin-bedded, buff weathering dolomite; f: closely spaced N80W, N20W

2019) Ojc quarry ledge, medium- to thick-bedded dolomite; f: widely spaced N80E, N10W

2020) Or medium-grained, poorly sorted, friable sandstone; Or-Ojc contact a approx. 1170 ft elevation or 40 ft higher than at bombing and strafing range in Bloodland quad.; f: widely spaced and poorly developed N20E, N50W

2021) Or medium-grained, poorly sorted sandstone; iron-stained seams; f: medium to closely spaced N15W

2022) Or sandstone in road cut

2023) Or medium- to thick-bedded sandstone; f: widely spaced N30-35E, N35W

2024) Sandstone float up to 3 ft square

2025) Chert float up to 2 ft square

2026) Or sandstone in road bed with stromatolitic chert below; f: closely spaced N20E, N10W

2027) Or sandstone in stream bed; no discernable fractures

2028) Light-brown, cherty residuum with minor sandstone fragments

2029) 1 ft of loess over cherty and sandy residuum; sandstone float made up of fine-grained, well-sorted sandstone

2030) Light-brown, cherty residuum with sandstone float

2031) Sandstone float up to 2 ft square

2032) Ojc Quarry Ledge at 1260 ft elevation, probably high in interval; f: very widely spaced N70E

2033) Ojc thin-bedded dolomite

April 9, 1995 Bloodland 7 ½' quadrangle

2034) Large sandstone and chert breccia float; sandstone float is white, fine-grained, well sorted Ojc

2035) Same as above

2036) Same as above with possible thin loess overlying residuum

2037) Thin (approx. 1 ft) loess over light-brown residuum with chert and sandstone float

2038) Ojc quarry ledge at 1110 ft elevation; small outcrop with no

discernable fractures; Or-Ojc contact placed at 1080 ft elevation

2039) Or (A) bedded and partially brecciated chert with some oolitic chert; f: widely spaced and poorly developed N10W

(B) medium-grained, poorly sorted sandstone with damp seeps; f: widely spaced N15-20E, E-W

(C) thick-bedded to massive sandstone; water in road ditch (C is topographically below B); possible sinkhole, 8-10 ft in diameter above this outcrop (may be a bomb crater); f: widely to medium spaced N30W, N85W

2040) Or medium-grained, poorly sorted sandstone; f: widely spaced N40E, N70W

2041) Or bluff containing interbedded sandstone and chert or similar lithologies to 2039

2042) Qal 2 ft high terrace above stream level

2043) Or sandstone with water seeping out of bottom of outcrop; this means that the Og-Or contact is no higher than 935 ft elevation in this area; also note that at least 70 percent of Or is sandstone in this area and for bombing and strafing range (data points 1971-1992), much less sandstone was observed in Or in Hurd Hollow and area to north (data points 1920-1956) where at least 50 percent of the formation is dolomite and chert; f: widely spaced N-S

2044) Or sandstone with thin dolomite beds; outcrop has a 1-3 in. wide, quartz-filled shear zone, closed and through going, N80W 75NE; f: medium spaced N60E, N20W, N35W

2045) Og medium-grained dolomite in stream bed overlain by 8 ft of thick-bedded dolomite with solution features in stream bank; f: medium spaced N80E, N20W

2046) Og 20 ft of massive dolomite up to approx. 960 ft elevation; note that there was no Og above 935 ft at 2043

2047) Light-brown residuum with no outcrops or large float

2048) Or sandstone with flowing spring below; spring discharging several gallons per minute; more springs topographically higher; f:

widely spaced N30E, N60E, N40W

2049) Og-Or contact at approx. 960 ft elevation; massive dolomite overlain by thick sandstone

2050) Or sandstone and beds with large mudcracks wrap around small stream; good water flow from beneath 7 ft of sandstone; f: widely spaced N75E through going and solution widened, N10W

2051) Or thick-bedded sandstone with minor dolomite below; f: widely spaced N30E, N60E, N50W

2052) Or sandstone; f: widely to medium spaced N20E, N40W

2053) Or sandy dolomite with solution features overlain by medium-bedded sandstone; bedding N10W 15NE; f: widely spaced in dolomite N60E, N50W, N70W; moderately spaced in sandstone N70E 80SE, N20W 75NE

2054) Or medium-bedded orthoquartzite; possible small syncline by looks of outcrops just down stream; bedding N60E 5NW; f: widely spaced N75E, N25W

2055) Or sandstone down to 960 ft elevation; f: widely spaced N30W, medium spaced N60E

2056) Or interbedded dolomite, sandstone, sandy dolomite, and minor chert; outcrop contains Og-Or contact and looks conformable; bedding appears to slope slightly to N; cave entrance (2 ft high by 4 ft wide) in outcrop trends N40E and contains a soil mound; entrance passage goes back at least 10 ft; water seeps occur near Og-Or contact; f: widely spaced N75E, N10W

2057) Or sandstone; f: widely spaced N40E, N20W; in beds just above-widely spaced N60E, medium spaced N5E

2058) Og-Or in bluff above Roubidoux Creek; fine- to medium-grained dolomite overlain by interbedded sandstone, dolomitic sandstone, and dolomite; Og-Or contact placed at approx. 960 ft elevation; large cave occurs in Og about 10 ft above creek level; entrance is 6 ft high by 20 ft wide; entrance passage trends N50E and secondary passage with spring trends N30W; cave contains large flowstone and stalactites and cave walls contain many 1-2 ft diameter cavities;

a flowing spring discharging a few gallons per minute occurs about 30 ft inside cave; a possible sinkhole (depression is larger than surrounding bomb craters) exists on hilltop above cave, 12 ft in diameter and 4 ft deep; fractures measured from Or sandstone; f: widely spaced N25W some through going, N65E

2059) Or medium-grained sandstone; brecciated chert float; f: widely spaced N50E, N15W

2060) Or sandstone same as 2059; bed appears to have dropped several feet down slope; much water is seeping from just above this sandstone bed with a very thick-bedded sandstone overlying; dolomite float; bedding is approx. horizontal; no discernable fractures

2061) Or sandstone, same as above; f: widely spaced N60E, N25W

2062) Large depression on hillside, 70 ft width; possibly sink

2063) Large depression similar to above

2064) Slump on hillside with 8-10 ft thick toe at base; bowl shaped and 30 ft across

2065) Or medium-grained, poorly sorted sandstone; Og dolomite occurs at river edge below at approx. 950 ft elevation; f: widely spaced N75E, widely spaced and closed N10W

2066) Og-Or contact at 960 ft elevation; cave occurs at contact; entrance 2.5 ft high by 3 ft wide and extends back approx. 25 ft and narrows; cave passage trends N20E; dolomite is sometimes iron-stained; f: widely spaced N80E (solution widened to moderate wide), N15W

2067) Og-Or contact; two more caves in same bluff as 2066, one in Og and one in dolomite bed above in Or; a resistant sandstone bed, 1 ft thick, separates the two caves that are also offset horizontally about 10 ft; sandstone bed is ceiling of lower cave and floor of upper cave; both entrances are 4 ft high by 5 ft wide and trend N10E; both caves are dry; upper cave extends about 30 ft; stratigraphic succession is 11 ft of Og dolomite, 1 ft Or sandstone, 7 ft Or dolomite, and several ft of Or sandstone; symmetrical ripples in thin sandstone at Og-Or contact trend N50W

2068) Og dolomite outcrop in entrance to side hollow of Roubidoux Creek; stream in hollow appears to sink, but sink area is clogged with much sediment; f: widely spaced E-W, N10W

2069) Light-brown residuum with sandstone and chert float

2070) Buff weathering dolomite float with lots of chert

2071) Cryptalgal chert near Or-Ojc contact; no discernable fractures

2072) Or dolomite and stromatolitic chert heads in stream bed; water is flowing in stream (dry period); green algae present in water; bedding N40W 15SW; f: medium spaced N40E, N30W

2073) Or dolomite and chert in stream bed; bedding is horizontal; f: medium spaced E-W, N30W, N60W

2074) Topographically above this point have large, 1 ft square chert float; below this point start picking up 1-2 ft square sandstone float

2075) Ojc thin-bedded, fine-grained dolomite; f: widely spaced and poorly developed N70E, N50W

2076) Small brecciated chert outcrop in road bed

2077) Chert float up to 1 ft square with some minor orthoquartzite float

2078) Sandstone float with small chert fragments in light-brown residuum

2079) Og dolomite with solution features; small cave; Og-Or contact at 962 ft elevation; f: widely spaced N60E, N10W

2080) Og same lithology as above; wet seeps (dry period); f: widely spaced and poorly developed N10W, N50W

2081) Og same lithology as above; some cavities up to 2 ft in diameter; bedding is horizontal; f: widely spaced N65E, N20W

April 10, 1995 Bloodland 7 1/2' quadrangle

2082) Light-brown cherty residuum with fist-size sandstone and chert float

2083) Small depression, possible sinkhole; 10 ft in diameter and less than 2 ft deep; damp in bottom

2084) Large puddle covers 40 ft of road on top of hill (dry period)

2085) Or stromatolitic chert outcrop in road bed with large slumped sandstone pieces above; f: widely spaced N40E, N70W

2086) Qal uppermost stream deposit in drainage

2087) Or medium-bedded, medium-grained, poorly sorted sandstone in dry stream bed; f: widely spaced N40E, N10W

2088) Light-brown residuum with no outcrop and no large float on hillside

2089) Or 3 feet of sandstone and chert in bank of Hurd Hollow stream; f: widely spaced and poorly developed N10W, medium spaced N70E

2090) Og medium-grained dolomite with minor solution features; water is ponding in stream in places; Og-Or contact is at about 955 ft elevation; bedding is horizontal; f: widely spaced E-W, N40E, N20W

2091) Qal uppermost stream deposit in drainage; no outcrop and no large float in this small hollow

2092) Og medium- to thick-bedded dolomite with solution features and cavities up to 2 ft in diameter; cavities are soil filled; f: widely spaced and poorly developed N75E, N40W

2093) Og 6 ft of massive dolomite with solution features; f: widely spaced E-W, N10W

2094) Large sandstone float up to 3 ft square on hillside

2095) Og 18 ft of massive dolomite with solution features; several beds contain cavities up to 2 ft in diameter; f: widely spaced E-W, N10W

2096) Og dolomite outcrop with small cave 15 ft above Qal that extends only a few feet

2097) Og dolomite in stream bed; f: widely spaced N50E, N5W

2098) Og dolomite in stream bed; f: medium spaced N20E, N50W, N80W

2099) Qal uppermost stream deposit in drainage, 3-4 ft thick

2100) Or medium-grained, poorly sorted sandstone; f: widely spaced N40E, N80W

2101) Chert and sandstone float up to 2 ft square

2102) Lowest stretch of Hurd Hollow that has some water in stream (dry period); water contains much green algae; water is ponded, not flowing; no obvious sinks or drains

2103) Og thick-bedded, medium-grained dolomite; f: widely spaced and poorly developed N75E, N40E

2104) Og same as above; f: widely spaced N50E, N10W

2105) Light-brown residuum with fist-size chert and sandstone float

2106) Light-brown cherty residuum with small sandstone float

2107) Qal uppermost stream deposit in hollow, 2 ft thick

2108) Sandstone and chert up to 2 ft square in stream; no outcrop or float on hillside; just down stream from this point have a little water ponded in stream (dry period)

2109) Og dolomite with solution features and cavities up to 1.5 ft high by 4 ft wide occurring 3 ft above stream bed; small amount of water (not flowing) in stream, but disappears in mid-channel gravel (dry period); f: moderately spaced N-S, E-W

2110) Og massive dolomite with solution features, many cavities, and several very small caves; bedding is horizontal; f: widely spaced and poorly developed N30E

2111) Og stromatolitic chert in stream bed; f: widely spaced N-S, N80E, N30W

2112) Og dolomite in stream bed; f: closely spaced N-S, E-W

2113) Or sandstone occurs about 20 ft above Qal or at about 980 ft elevation; no discernable fractures

2114) Or medium-bedded, medium-grained, poorly sorted sandstone; water in stream here and for 100 yds down stream where it is ponded; no water in stream immediately above this point (dry period); f: widely spaced N50E, N20W

2115) Or sandstone in stream bed; bedding horizontal; f: widely spaced N10E, N70W

2116) Or stromatolitic chert in stream bed; no discernable fractures

2117) Qal uppermost stream deposit in hollow, up to 3 ft thick

2118) Small sandstone and chert float

2119) Or medium- to thick-bedded, medium-grained sandstone; water in stream flows over top of bed for distance of outcrop (approx. 60 ft), into stream bed, then ponds and disappears in stream gravel (dry period); f: widely spaced N-S, N70W

2120) Or 2 ft of sandstone overlain by 1 ft of stromatolitic chert, 2 ft of sandstone, and 2 ft of chert; f: widely spaced and poorly developed N-S, N80E

2121) Qal uppermost stream deposit in hollow

2122) Qal uppermost stream deposit in hollow

2123) Small spring (less than 1 gallon per minute) feeding stream (dry period)

2124) Or sandstone in stream bed; contains asymmetrical ripples having a flow direction of S10W; water flowing in stream has much of the white foamy substance and some green algae (dry period); f: medium spaced N35E, N10W, N80W

2125) Very large sandstone blocks slumped on hillside

2126) Or medium-bedded, medium-grained, poorly sorted sandstone overlain by stromatolitic chert; f: widely spaced N-S, N80E

2127) Or sandstone outcrop 6 feet above stream or at 960 ft elevation; much water flowing in stream with much white foamy substance (dry period)

2128) Or massive sandstone outcrop; no discernable fractures

2129) Or sandstone in stream bed; f: widely spaced N80E, N10W

2130) Qal uppermost stream deposit in hollow; deposit as much as 4 ft thick near bottom of hollow

2131) Extremely large (automobile size) sandstone boulders in stream; boulders have rounded corners and edges; also a few small dolomite blocks

2132) Or thin-bedded, medium-grained sandstone 5 ft above stream or at 955 ft elevation

2133) Or sandstone at 948 ft elevation; f: widely spaced N-S, medium spaced E-W

2134) Or sandstone at 940 ft elevation; much water flowing in stream (dry period); f: widely spaced N-S, N60E

2135) Or sandstone with no discernable fractures

2136) Long stretch of no outcrop in stream banks or in stream bed; some sandstone and chert float; down to 930 ft elevation and still no Og although there is Og at 960 ft elevation only 0.3 mi downstream; probably a fault or a fold between 2136 and 2110

2137) Sandstone and chert float up to 1 ft square

2138) Water flowing in stream starts to disappear in channel gravel (dry period); possible indication of fault?

2139) Or sandstone; f: widely spaced N-S, E-W

2140) Fist-size chert and sandstone float

2141) This is where water starts to flow in Hurd Hollow stream (dry period); water above this is ponded in various places; no obvious springs or seeps at this point

2142) Fist-size chert and sandstone float

2143) Or sandstone in stream bed overlain by 3 ft of stromatolitic chert in stream bank; symmetrical ripples trend N10W; bedding is horizontal; f: medium spaced E-W, closely spaced N-S

2144) Water seeping into stream bed at chert layers; water ponds and does not flow downstream (dry period)

2145) Or stromatolitic chert in stream bank; no discernable fractures

2146) Or 5 ft thick massive sandstone; f: widely spaced N-S, N70E

April 11, 1995 Brownfield 7 ½' quadrangle

2147) Light-brown residuum with small chert and sandstone float

2148) Same as above

Bloodland 7 ½' quadrangle

2149) Light-brown residuum with sandstone float up to 3 ft square

2150) Or stromatolitic chert outcrop in road bed; no discernable fractures

2151) Or chert in road bed; f: widely spaced N70E, N10W

2152) Or sandstone; note that Roubidoux Creek, which was completely dry the day before is flowing from bank to bank after thunderstorms overnight and steady rain at this time; f: widely spaced N70E, N20W

2153) Og-Or contact at 960 ft; stratigraphic succession (ascending) is 6 ft Og dolomite overlain by 3 ft sandstone of Or, 1 ft of chert, 2 ft of dolomitic sandstone, 2 ft of stromatolitic chert; 1 ft of dolomite with solution features; there is a spring just beneath road that is discharging upwards of 10 gallons per minute and pulsates every 3 seconds (wet period); f: medium spaced N-S, E-W

2154) Og dolomite with cavities in hillside; f: widely spaced N-S, N80W

2155) Og stromatolitic chert; f: widely spaced N70E, N10W, N70W

2156) Og dolomite makes up large bluff

2157) Og dolomite; f: widely spaced and poorly developed N40E, N20W

2158) Og massive dolomite in bluff; bedding is horizontal; f: widely spaced N50E, N40W

2159) Og same as above; f: widely spaced E-W, N10W

2160) Og same as above; f: widely spaced E-W, N10W

2161) Og stromatolitic chert; f: widely spaced N10E, N70W

2162) Og dolomite; f: widely spaced N20E, N70W

2163) Og dolomite; bedding is horizontal; f: widely spaced N40E, N50W

2164) Light-brown, cherty residuum with fist-size chert and sandstone float

Brownfield 7 ½' quadrangle

2165) Or dolomite overlain by chert; f: widely spaced and poorly defined N40E, N80E

2166) Possible very thin brown loess over light-brown cherty residuum

2167) Ojc? chert pavement outcrop in road bed; f: medium spaced N20E, N80W

2168) Medium-brown residuum with chert and some sandstone float

2169) Ojc light-gray, fine-grained sandstone; f: widely spaced N60E, N20W

2170) Reddish-brown cherty residuum with fist-size and slightly larger sandstone and chert float

2171) Og dolomite bed on Rt. NN; bedding is horizontal; f: widely spaced N10E, N75W

2172) Light-reddish-brown cherty residuum with small sandstone float on base road at Greenview

Bloodland 7 1/2' quadrangle

2173) Light-reddish-brown cherty residuum with large sandstone float on hilltop

2174) Or medium-grained, poorly sorted sandstone; no discernable fractures

2175) Or sandstone same as above; f: widely spaced and poorly developed N50E, N20W, N60W

2176) Light-brown cherty residuum with some fist-size sandstone float

April 12, 1995 Bloodland 7 1/2' quadrangle

2177) Light-brown, cherty residuum with minor sandstone float

2178) Same as above

2179) Medium-brown silty soil (loess?) with very small chert fragments

2180) Medium- and light-brown cherty residuum with scattered sandstone and chert float up to 1 ft square

2181) Or thick-bedded, medium-grained, poorly sorted sandstone on steep slope; bedding N5E 12SE; f: widely spaced E-W, medium spaced N-S

2182) Light-brown cherty residuum with sandstone and chert float up to 1.5 ft square

2183) Og dolomite and chert; f: widely spaced N50W, N80W

2184) Og dolomite and chert; horizontal; no discernable fractures

2185) Spring at base of Og outcrop (rain last two days)

2186) Og vuggy chert; f: widely spaced N70E, N50W

2187) Og 20 ft bluff of massive dolomite with solution features and large cavities up to 3 ft in diameter; 3 ft chert zone at about 10 ft; f: medium spaced N70E, N20W

2188) Or sandstone at about 980 ft elevation; f: widely spaced N-S, E-W

2189) Sandstone and chert float up to 2 ft square

2190) Much sandstone and chert float up to 1.5 ft square

2191) Og dolomite in stream bed at 950 ft elevation; f: widely spaced N20E, E-W

2192) Or sandstone; f: widely spaced and poorly developed N-S, N60E

2193) Or 3 ft of stromatolitic chert overlain by 1 ft of light-gray dolomite with solution features; f: medium spaced at N10W, N80W

2194) Og massive dolomite in bluff; Og-Or contact at 970 ft elevation

2195) Og same as above; f: widely spaced N-S, E-W

2196) Og same as above; bedding is horizontal; f: widely spaced at E-W, N10W

2197) Light-brown, cherty residuum with some 1 ft square sandstone float

2198) Qal uppermost stream deposit in hollow; much more chert (up to 1 ft square) in residuum with sandstone than what was at top of hill at 2197

2199) Or medium-grained, poorly sorted sandstone; contains symmetrical ripples trending N20W; bedding N-S 8W; f: medium spaced N10W, N60W

2200) Or stromatolitic chert; some heads up to 1 ft across; sandstone in road bed down to 960 ft elevation; f: widely space and poorly developed N-S, N70E

2201) Or sandstone in road bed at Qal level; no discernable fractures

2202) Sandstone and chert float; no outcrop on steep hillside

2203) Og thick-bedded dolomite with solution features; some beds have cavities up to 1 ft in diameter; water seeping from top of outcrop (rain last two days); this outcrop is at 940 ft elevation; bedding is horizontal; f: widely spaced N75E, N30W

2204) Or medium-bedded sandstone at 980 ft elevation; outcrop is a monocline 30 ft across, horizontal on north end of outcrop and is N50E 25SE on south end; wet seeps dripping from outcrop (wet period)

2205) Og cave in bluff, entrance is 6 ft high by 10 ft across but narrows to 4 ft diameter 15 ft in; cave trends approx. N60W for 15 ft; water trickles from cave entrance and there are many wet seeps; high water flow in Roubidoux Creek after storms and rain last two days; f: widely spaced and poorly developed N40E, N30W

May 16, 1995 Brownfield 7 1/2' quadrangle

2206) Medium-brown, silty soil (loess) with small, sparse chert fragments

2207) Same as above, loess at least 1.5 ft thick

2208) Same as above with more small chert fragments, fist-size sandstone float on surface

2209) Same as above with well-sorted, fine- to medium-grained sandstone boulders on surface

Bloodland 7 1/2' quadrangle

2210) Medium- to light-brown, silty residuum with small chert fragments and fist-size sandstone and chert float

2211) Same as above

2212) Yellowish-brown residuum with many sandstone and chert fragments and much sandstone and chert float as much as 2 ft square

2213) Og medium-bedded dolomite with 1 ft diameter cavity at base of 3 ft thick outcrop; whole outcrop seeping (wet period); f: widely spaced and poorly developed N20W

2214) Og water in stream disappears (wet period); good flow upstream at 2213 but water trickles away underneath Og outcrop in stream bed

2215) Og massive, medium-grained dolomite in stream bank; f: medium spaced N-S, N80E

2216) Og massive, medium-grained dolomite; f: medium spaced N-S, N80E

2217) Og large bluff of massive dolomite

2218) Water reappears in stream as small trickle from gravel and flow increases in a very short distance down stream (wet period)

2219) Og massive dolomite in bluff; also, terrace level is 8 ft above Qal; f: widely spaced N-S, N80E

2220) Or Slumped sandstone ledge at 930 ft elevation; block is 20 ft long by 5 ft thick; note there is no Og exposed in this hillside

like there is to north

2221) Og? 5 ft outcrop of medium-bedded, fine-grained, light-brown to tan dolomite; f: widely spaced N-S, N80E

2222) Og massive dolomite bluff with cave; appears to have a medium-bedded sandstone bed near top of bluff at about 950 ft elevation; good flow in Roubidoux Creek (wet period); f: widely spaced and poorly developed N40E; widely spaced N20W

2223) Or thin-bedded, poorly sorted sandstone; f: widely spaced E-W, N20W

2224) Og massive dolomite; f: medium spaced N-S, widely spaced E-W

2225) Og massive dolomite bluff with wet seeps (wet period) and a few 1 ft diameter cavities; f: widely spaced N-S, E-W

2226) Og cave at base of bluff, entrance is 4 ft high by 6 ft wide

2227) Note no outcrop along this hillside

2228) Same as above

2229) Tributary to Roubidoux Creek is dry near its confluence with the Roubidoux (wet period)

2230) Water from Roubidoux Creek is backed up to this point in this tributary; note Roubidoux is not fast flowing at this point (wet period)

2231) Og small outcrop of medium-grained dolomite; f: widely spaced N-S; widely spaced and poorly developed N80E

2232) Og dolomite in stream bank; f: widely spaced N70E; medium spaced N20W

2233) Og medium-grained dolomite; f: widely spaced and poorly developed N60W

2234) Point in stream where water disappears (wet period); water

from upstream flows into a ponded area with green algae; no water down stream

2235) Og massive dolomite with small cavities; bedding is horizontal; f: widely spaced and poorly developed N-S, N70E

2236) Og dolomite in stream bed; stream has much flowing water at this point (wet period); f: medium spaced N75E, N20W

2237) Sandstone and chert float as much as 2 ft square

2238) Og large dolomite bluff with some small cavities and water seeps (wet period)

2239) Water flow in Roubidoux Creek is definitely reduced from areas up stream

Brownfield 7 1/2' quadrangle

2240) Og massive dolomite bluff; bedding is horizontal; f: widely spaced and poorly developed N70E, N20W

Bloodland 7 1/2' quadrangle

2241) Or reddish-orange weathering, poorly sorted, medium- to coarse-grained sandstone; f: widely spaced and poorly developed N10E, E-W

Brownfield 7 1/2' quadrangle

2242) Very clayey, deep reddish-orange residuum with many small chert fragments and fist-size sandstone and chert float

2243) Ojc chert breccia in roadbed; probably not in place

Bloodland 7 1/2' quadrangle

2244) Boulders of fine-grained sandstone as float

2245) Ojc fine-grained, light-gray weathering sandstone; f: widely spaced and poorly developed N10E, E-W

2246) Clayey, deep reddish-orange residuum with many small chert fragments

2247) Light-brown, silty residuum with chert fragments; no large float on surface in this area

2248) Same as above

2249) Same as above; man-made pond

2250) Same as above

2251) Light-brown residuum with fist-size, medium-grained sandstone float

2252) Light-brown, silty residuum with chert fragments; no large surface float

May 19, 1995 Brownfield 7 1/2' quadrangle

2253) Yellowish-brown to light-brown residuum with chert fragments

2254) Or-Ojc contact interval; brecciated chert and buff to yellowish weathering dolomite; breccia clasts as much as 4 inches square; chert several feet higher is algal; dolomite is fine grained, light brown, and laminated in places; Or-Ojc contact is at about 1040 ft elevation; bedding N60W 3SW but surface undulates; f: medium spaced N20E; closely spaced N70E, N60W

2255) Reddish-orange residuum with much chert float and some sandstone float; sandstone float contains some fine-grained sandstone and some coarse-grained sandstone

2256) Chert float on top of hill contains some breccia

2257) Very little float on top of hill; a couple of pieces of fine-grained, well sorted sandstone

2258) Same as above

2259) Ojc Quarry Ledge at 1100 ft elevation; vuggy cotton rock dolomite; tan to light gray, fine grained; f: widely spaced and poorly developed N30E, N40W

2260) Ojc Quarry Ledge at 1080 ft elevation; fine-grained, light-tan to light-gray dolomite; f: widely spaced N80W, N10W

2261) Ojc? dolomite with well developed fractures; horizontal; f: medium spaced N30E, N40W; closely spaced N70E, N10W

2262) Or thin-bedded, white, fine-grained, well-sorted sandstone with mudcracks on the top of some beds; bedding is horizontal; f: medium spaced N80W, N10W

2263) Or 3 ft thick bed of stromatolitic chert with 3 inch thick, medium-grained, poorly sorted sandstone bed; f: medium spaced N50E, N40W

2264) Or stromatolitic chert and medium-bedded, medium-grained, poorly sorted sandstone; f: widely spaced N10E, E-W

Bloodland 7 1/2' quadrangle

2265) No outcrop in this area; this could be an extension of fault from southeast; farther down stream (to east) have Og up to 980 ft elevation; Or-Ojc contact is at about 1040 ft elevation just up stream (to west); if no fault, then Or would only be 60 ft thick

2266) Or sandstone slightly slumped

2267) Light-brown, cherty residuum with minor fist-size sandstone float

2268) Same as above but start picking up larger sandstone and stromatolitic chert float; sandstone float is medium grained and poorly sorted

2269) Or in roadbed, probably slumped

2270) Or medium- to thick-bedded, medium-grained, poorly sorted,

tan to reddish-tan sandstone; bedding N-S 23W; f: widely spaced N40W 75SW, N-S

2271) Or thick-bedded sandstone containing some beds with ripples; ripples are asymmetrical with flow trend of N75W; bedding is horizontal; f: medium spaced E-W; widely spaced N10W

2272) Og massive dolomite; Og-Or contact at 970 ft elevation; f: widely spaced E-W; medium spaced N10W

2273) Og massive dolomite; bedding is horizontal; f: widely spaced N-S, N80E

2274) Light-brown residuum with small chert fragments and minor sandstone float

2275) Light-brown silty soil with very little chert (loess)

2276) Same as above; start picking up Or sandstone float as much as 0.5 ft square

2277) Or sandstone probably in place; f: widely spaced N-S, N80E

2278) Or medium-bedded, medium-grained sandstone; bedding is horizontal; f: widely spaced N30E, N70W

2279) Og medium-grained, massive dolomite; Og-Or contact at 950 ft elevation; f: widely spaced and poorly developed N30E, N40W

2280) Og massive dolomite bluff with cavities and wet seeps (wet period); f: widely spaced and poorly developed N30E, N20W

2281) Large pieces of Or sandstone and chert float

2282) Can identify 2 terrace levels, one at 5 ft above stream and other at 9 ft above stream

2283) Another terrace level at 13 ft above stream level

2284) Much chert float containing stromatolitic chert and chert with preserved rip-up clasts; some minor sandstone float

2285) Light-brown residuum with very little float

2286) Sandstone and chert float (from Or?) as much as 1 ft square

2287) No outcrop (vegetation extremely thick)

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2288) Or oolitic chert in road ditch; bedding is horizontal; f: widely spaced N30E, N80W

2289) Or stromatolitic chert in ditch; f: widely spaced N-S, N60E

2290) Or-Ojc contact interval?; thin-bedded, yellowish-weathering dolomite; f: closely spaced N-S, N70E

2291) Or poorly sorted, rusty-weathering sandstone with a conglomerate bed that contains clasts of oolitic chert in a medium- to coarse-grained matrix; also have a stromatolitic chert bed; f: medium spaced N50E, N10W

2292) Or stromatolitic chert in ditch; f: medium spaced N10E, N70W

2293) Or poorly sorted, medium-grained, rusty-weathering sandstone with ripples; ripples are asymmetrical with a flow trend of N65W; bedding N70E 17NW; f: closely spaced N50E 63SE; medium spaced N70W

2294) Or stromatolitic chert in road bed; no well developed fractures

2295) Or medium-grained, poorly sorted sandstone; horizontal; f: medium spaced N-S and widely spaced E-W

2296) Or sandstone with two beds of ripples and one with mudcracks; ripples on lower bed are symmetrical and trend N50E (1/2 inch wavelength); ripples on upper bed are asymmetrical and have a flow trend of N50E (2 inch wavelength); bedding N-S 21W (although beds above are horizontal); traverse down ditch exposes horizontal bedding followed by 20 degree dipping bed followed by horizontal bedding followed by 20 degree dipping bed; f: widely spaced N60E, N20W

2297) Or section in road ditch contains (ascending) 3 ft sandstone, 1 ft dolomite, 2 ft sandstone, 2 ft dolomite, 1 ft sandstone, 2 ft dolomite, 1 ft chert; sandstone is medium-grained with some ripples; dolomite in thin-bedded; Or section starts at about 980 ft elevation; f: widely spaced and poorly developed N80E, N40W

2298) Og massive dolomite; f: widely spaced and poorly developed N60E, N70W

2299) Og thick-bedded, medium-grained dolomite; f: widely spaced and poorly developed N30E, N40W

2300) Bowl-shaped karst collapse in hillside; Or sandstone exposed in highly weathered cut; Og-Or contact at about 970 ft elevation

Roby 7 1/2' quadrangle

2301) Light-brown to tan, cherty residuum with fist-size (and a few larger) sandstone float

2302) Ojc light-gray, medium-grained, well sorted sandstone; f: widely spaced and poorly developed N20E, E-W

2303) Ojc light-gray, fine-grained sandstone; bedding is horizontal; f: widely spaced and poorly developed N70E, N10W

2304) Light-brown to tan, cherty residuum with fist-size sandstone and chert float

2305) Same as above with some yellow-weathering, platy dolomite float

2306) Or fine-grained, white sandstone in road bed; bedding is horizontal; f: medium spaced N60-70E, N30E, N-S, N40W

2307) Or stromatolitic chert; horizontal; f: widely spaced and poorly developed N-S, N80E

2308) Og massive dolomite bluff up to about 1015 ft elevation; stream undercuts bluff; f: widely spaced poorly developed N-S, N70E

2309) Og massive dolomite bluff up to 1005 ft; stream undercuts bluff; cavities developed near base of bluff; f: widely spaced N-S, N70E

2310) Or medium-grained sandstone at 1030 ft elevation; f: widely spaced N30E, N50W

2311) Or stromatolitic chert; f: widely spaced N-S, N80W

2312) Or fine-grained, white, well sorted sandstone; f: widely spaced N70E, N30W

2313) Light-brown residuum with mostly fist-size, fine-grained sandstone float

2314) Same as above

2315) Same as above

2316) Or light-gray, medium-grained, well-sorted sandstone; bedding is horizontal; f: widely spaced N30E, N60W

2317) Or same as above; f: widely spaced N30E, N60W

2318) Og extension of large bluff at station 2015; deep water in Roubidoux Creek (wet period); f: widely spaced N-S, E-W

2319) Og massive dolomite; f: widely spaced and poorly developed N-S, N80E

2320) Og massive dolomite; f: widely spaced N80E, N10W

2321) Og massive dolomite; much water in this stream (wet period); f: widely spaced N-S, N80E

2322) Og medium-grained, thick-bedded dolomite; f: widely spaced and poorly developed N-S, E-W

2323) Much fine-grained sandstone float and a few boulders

2324) Light-brown residuum with fist-size sandstone, chert and chert breccia float

2325) Thin, brown, silty loess

2326) Or sandstone slumped on hillside

2327) Or sandstone (probably in place); f: widely spaced and poorly developed N30E, N50W

2328) Og massive dolomite; bedding is horizontal; f: widely spaced N-S, N80E

May 21, 1995 Bloodland 7 1/2' quadrangle

2329) Light-brown, cherty residuum with fist-size and larger chert float; some chert breccia float

2330) Ojc? light-gray to tan, vuggy dolomite with irregular surface; ?Quarry Ledge; f: widely spaced N50E, N50W

2331) Ojc? same as above

2332) Or medium-grained, poorly sorted, thick-bedded sandstone and sandy dolomite; small outcrop of breccia (fault breccia?); masses of dolomite and sandstone as much as 5 inches in diameter in fine matrix; f: widely spaced and poorly developed N40E, N50W

2333) Or chert in ditch; just up road have sandstone with large ripples; ripples are asymmetrical with a flow trend of N10E; f: medium spaced N40E, N50W

2334) No outcrop on this knob in cut-off meander bend of Roubidoux Creek; some sandstone and chert float

2335) Or stromatolitic chert with interbedded thin beds of dolomite; many wet seeps (wet period); bedding is horizontal; f: widely spaced and poorly developed N70E, N20W

2336) Or chert with minor sandstone; f: widely spaced and poorly developed E-W, N10W

2337) No outcrop; some sandstone and chert float

2338) Minor sandstone float

2339) Same as above; no outcrop

2340) Light-brown, cherty residuum with 1 ft square stromatolitic and oolitic chert float

2341) Same as above, but with less chert float

2342) Ojc thin-bedded, fine-grained, tan dolomite with undulating bedding surface in road bed; further up road have vuggy dolomite; f: widely spaced and poorly developed N10W; medium spaced N80W

2343) Ojc stromatolitic chert in road bed; f: widely spaced and poorly developed N10E, E-W

May 22, 1995 Roby 7 1/2' quadrangle

2344) Light-brown residuum with mostly chert float with some sandstone float

2345) Same as above

2346) Light- to medium-brown residuum with no float

2347) Same as above, but start picking up some chert and sandstone float

2348) Ojc Quarry Ledge; pavement outcrop of light-gray, medium- to fine-grained, vuggy dolomite; f: widely spaced N80E, N40W

2349) Yellowish-brown to reddish-orange, cherty residuum with fist-size chert and sandstone float

2350) Same as above

2351) Light-brown, cherty residuum with a few 1.5 ft square sandstone float blocks and smaller chert float

2352) Ojc Quarry Ledge; consistent with 2348; f: widely spaced N40-50E, N30-40W

2353) Or-Ojc contact interval; thin-bedded dolomite overlain by 2 ft thick bed of medium-grained, well sorted sandstone; bedding is horizontal; f: widely spaced N20E, N60W

2354) Light-brown, cherty residuum with fist-size sandstone and chert float

2355) Or medium- to thick-bedded, fine- to medium-grained, very light-gray, well sorted sandstone; bedding is horizontal; f: widely spaced N10E, N70W

2356) Or same as above; possibly slightly slumped; f: widely spaced N30E, N60W 75NE

2357) Ojc dolomite in stream bed; much green algae in stream; f: widely spaced and poorly developed N20E, N50W

2358) Large pieces as much as 2 ft square of fine-grained sandstone in float

2359) Same as above, but also have some chert float

2360) Very few large float blocks

2361) Or? medium-bedded, fine-grained, light-gray sandstone; bedding is horizontal; f: widely spaced and poorly developed N30E, N70W

Brownfield 7 1/2' quadrangle

2362) Og massive dolomite bluff; bedding is horizontal; f: widely spaced N40E, N50W

2363) Og same as above; f: widely spaced N-S, E-W

2364) Og same as above; f: widely spaced N-S, E-W

Bloodland 7 1/2' quadrangle

2365) Or light-gray, fine-grained, well sorted sandstone in road ditch; bedding is horizontal; f: widely spaced N10E, N80E

2366) Or chert outcrop in road bed; f: widely spaced N10E, N80W

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2367) Medium- to light-brown residuum with fist-size chert float

2368) large (2 to 3 ft square) stromatolitic chert blocks; residuum is cherty and medium-brown

Waynesville 7 1/2' quadrangle

2369) Og massive dolomite in 3 ft thick outcrop; f: widely spaced N20E, N80W

2370) Og massive bluff of dolomite; bluff contains York cave which is a very large opening approximately 12 ft high by 20 ft wide; f: widely spaced N10E, E-W

2371) Og thick-bedded, medium- to coarse-grained dolomite; bedding is horizontal; f: widely spaced N10E, E-W

2372) Og stromatolitic chert in gully in road bed; f: widely spaced and poorly developed N10E, E-W

2373) Og dolomite pavement in road bed; f: widely spaced N10E, E-W

2374) Or medium-grained, poorly sorted sandstone in road bed; fractures not well developed; Og-Or contact at 980 ft elevation

2375) Og massive dolomite in bluff; bedding is horizontal; f: widely spaced N40-50E, N50-60W

2376) Og dolomite overlain by 2 ft of stromatolitic chert; bedding is horizontal in dolomite; f: widely spaced N80E, N10W

2377) Many large stromatolitic chert boulders

2378) Og thick-bedded dolomite; horizontal; f: widely spaced and poorly developed N70E, N10W

2379) Chert boulders on hillside

2380) Og thick-bedded dolomite; bedding is horizontal; f: widely spaced N50E, N30W

Bloodland 7 1/2' quadrangle

2381) Ojc quarry ledge; note that quarry ledge stays at approximately 1150 ft elevation across extension of fault that is seen along Roubidoux Creek and Hurd Hollow

2382) Or interbedded sandstone, chert, and minor dolomite in ditch; some beds contain mudcracks; f: medium spaced N20E, N70W

2383) Or medium-grained sandstone; bedding is horizontal; f: medium spaced N50E, N30W

2384) Ojc quarry ledge; down to 1110 ft elevation; bedding N33W 7NE; f: medium spaced N70E, N10W

2385) Or medium- to coarse-grained, poorly sorted sandstone; f: widely spaced N70E, N20W

2386) Or? platy weathering dolomite overlying medium-bedded dolomite in sinkhole; sinkhole is open throat with three 1 ft diameter pipes in bottom; outcrop makes up one side of sinkhole; bottom of sinkhole only contains some soil and a small amount of leaf litter; soil sample taken for clay analysis; f: widely spaced and poorly developed N-S, N60E

2387) Sinkhole adjacent to emergency landing strip at airport has been filled; many small depressions exist in the fill area; no sample taken

2388) Sinkhole at airport; contains water and much vegetation; sample taken near water edge for clay analysis

Big Piney 7 1/2' quadrangle

May 24, 1995

2389) Light-brown residuum with small chert fragments and fist-size sandstone and chert float

2390) reddish-orange residuum with many small chert fragments

2391) Or thin- to medium-bedded, medium-grained, rusty weathering sandstone in ditch; bedding irregular, but basically horizontal; f: widely spaced and poorly developed N-S, N80W; widely spaced N30W; medium spaced N50E

2392) Or medium-bedded, medium-grained sandstone; bedding irregular; f: widely spaced and poorly developed N-S, N80W

2393) Or thin-bedded sandstone; f: widely spaced E-W; medium spaced N40W

2394) Or medium- to thick-bedded, medium-grained, poorly sorted sandstone; bedding is horizontal; f: widely spaced N40E, N50W

2395) Light-brown cherty residuum with fist-size sandstone float

2396) Og stromatolitic chert in ditch of new road leading to Ross Bridge; f: closely spaced N50E, N40W; widely spaced N60W

2397) Or medium- to thick-bedded sandstone; f: widely spaced N70E, N10W

2398) Og stromatolitic chert overlying dolomite; f: widely spaced N80W, N10W

2399) Og thick-bedded dolomite; f: widely spaced and poorly developed N30E, N50W

2400) Og thick-bedded chert; f: medium-spaced N50E, N10W

2401) Og thick beds of chert overlain by thick-bedded dolomite in bluff; bedding is horizontal; f: widely spaced N-S, N40E, N60W

2402) Or rusty weathering, medium-bedded sandstone overlying oolitic chert in ditch; f: medium spaced N10E, N80W

2403) Or white orthoquartzite in road ditch; bedding is horizontal but slopes off down ditch to N52E 26NW; f: closely spaced (from horiz. bed) N-S, N40E, N80E

Waynesville 7 1/2' quadrangle

2404) Two closed depression sinkholes with good soil formation and vegetation in bottom; gentle to moderate slopes; some colluvium in bottom; soil sample taken from 1 ft diameter soil pipe in flat bottom of one sinkhole for clay analysis

2405) Sinkhole with flat bottom and gentle slope; much vegetation in sinkhole; soil is cherty; sample taken from flat bottom area for clay analysis

5/16/95 Waynesville 7.5' Quadrangle

2406) Og thin- to medium-bedded, fine- to medium-grained dolomite; horizontal, overlain by Or thin- to medium-bedded, fine- to coarse-grained quartz sandstone; f: closely spaced N75E, N-S, N35W (measured in basal bed of Or); Or/Og @ 960' elev.

2407) Or thin- to medium-bedded, fine- to coarse-grained quartz sandstone, poorly exposed; horizontal; Or/Ogu 960'elev.

2408) Og medium- to thick-bedded, medium-grained dolomite; horizontal; poor but extensive exposure forming bald; no sandstone up to 1,000' elev.

2409) Or thin- to medium-bedded, fine- to coarse -grained quartz sandstone, exposed in ledge on west side of gulley; horizontal; Or/Ogu at 1005' elev.

2410) Og medium-bedded, fine- to medium-grained dolomite; some thin chert layers interbedded; horizontal; f: closely spaced N25E, moderately spaced N75W

2411) Or thin- to medium-bedded, fine- to coarse-grained basal sandstone; poorly exposed; about horizontal; Or/Ogu contact appears to be at 955' elev.

2412) Or sandstone float caps hill cresting at 1005' elev.; Or/Ogu estimated at about 1,000'

5/19/95 Waynesville 7 1/2' quadrangle

2413) Og medium- to thick-bedded, fine- to medium-grained dolomite interbedded with stromatolitic chert; horizontal; f: closely spaced N80E; N60E, N30W, N55W

2414) Or thin- to medium-bedded, fine- to coarse-grained basal sandstone, poorly exposed in roadbed; Or/Ogu contact at 995' elev.

Bloodland 7.5' Quadrangle

2415) Or thin to medium-bedded, fine- to coarse-grained sandstone, overlying Og dolomite and chert; horizontal at east end of outcrop but fault exposed in ditch at west end near creek tilts bedding to N40-50E 40-55°NW; Or/Ogu at 980'elev. on east side and at 940' on west side of fault; f: moderately spaced N50-60E, N50-55W, **through going**

2416) Or/Og 5' of thin- to medium-bedded, fine- to medium-grained dolomite; overlain by 2' of medium-bedded, fine- to coarse-grained quartz sandstone, overlain by 8' of thin- to medium-bedded, fine- to medium-grained Or dolomite; overlain by 3' of thick-bedded, fine- to coarse-grained sandstone; overlain by Or dolomite rubble; horizontal; Or/Ogu at 935' elev.

2417) Or thin-bedded, fine- to coarse-grained quartzite, and interbedded medium-bedded, fine- to medium-grained dolomite; outcrop at 1010' elev.

2418) Or thin- to medium-bedded, fine- to coarse-grained sandstone and interbedded thin- to medium-bedded, fine- to medium-grained dolomite; N20E 57°NW; appears to be drape over fault

5/20/95 Big Piney 7.5' Quadrangle

2419) Or/Og medium- to thick-bedded, medium-grained dolomite; approximately horizontal except for a depressed area about 30' across (collapsed sinkhole?); capped by thin- to medium-bedded, fine- to coarse-grained quartz sandstone; Or/Og at 940' elev.

2420) Or/Og medium- to thick-bedded, medium-grained dolomite;

overlain by thin- to thick-bedded, fine- to coarse-grained quartz sandstone; contact gently to steeply rolling with about 10-15' of vertical relief (collapsed sinkholes and/or downhill slump?), broadly horizontal; crests of rolls at 940' elev., so Or/Ogu contact placed at that elevation

2421) Og medium-bedded, fine- to medium-grained dolomite; horizontal; vuggy surface and mostly mossed over; f: moderately spaced N50E, N10W, N50W

2422) Og medium-bedded, fine- to medium-grained dolomite; horizontal; vuggy surface and partly mossed over; f: widely spaced N60E, N30W

2423) Og medium-bedded, fine- to medium-grained dolomite interbedded with stromatolitic chert; horizontal; vuggy surface and some small caves; f: closely spaced N70E, N25E, N10W, N40W, N85W/72NE, **through going**

2424) Og thin- to medium-bedded, fine- to medium-grained dolomite interbedded with stromatolitic chert; horizontal; vuggy surface and some small caves; f: closely spaced N45E 73°SE, N35W, some **through going**

2425) Og thick-bedded, fine-grained dolomite; irregular chert nodules and lenses; horizontal; small caves locally common; f: widely spaced N55E, N10W, N60W, **through going**

2426) Og thin-bedded, fine-grained dolomite, capped by thick-bedded chert; horizontal; Ogu/Ogl at 815' elev.; f: closely spaced N15E, N20W, N50E in dolomite, chert pervasively fractured

2427) Og high rock cliff exposure, not visited

2428) Quaternary landslides, some recent and some old

2429) colluvium/residuum rubble filled steep gulley, no outcrop, some Or sandstone among float

2430) alluvium/colluvium/residuum; long gulley with no outcrop, upper part mostly free of rubble but lower reaches with abundant large jumbled blocks

2431) Og thin- to medium-bedded, medium- to coarse-grained dolomite; horizontal; vuggy surface with small caves; small outcrop mostly covered by moss located above spring with about 100 gpm or more flow; f: moderately spaced N55E, N35E, N70W

2432) Og thick bed of chert in an otherwise poorly exposed and badly weathered dolomite outcrop; horizontal; f: widely spaced N40W

2433) Og thin- to medium-bedded chert with abundant voids partly filled by red clay; some voids lined with druzzy quartz crystals; molds and casts of fossil snails, trilobite?, and nautiloid? present in bed at 850' elev. (about 35' above Ogl contact); f: closely spaced N55E, N10E, N20W, N50W

2434) Qal sand, medium- to coarse-grained, gravelly with clasts composed of subangular Og chert and Or sandstone; sporadically exposed terrace deposit

5/21/95 Big Piney 7 1/2' quadrangle

2435) Og thin- to medium-bedded, fine- to medium-grained dolomite; horizontal; mossy and vuggy surface with small caves; f: widely spaced N60E, N50W, some through going

2436) Og thick-bedded, fine- to medium-grained dolomite; horizontal; one ledge holds up 10' waterfall; f: medium to widely spaced N55E, N15E, N50W

2437) Og thin-bedded, fine- to medium-grained dolomite; horizontal; a few small caves in cherty layers; f: widely spaced N5E, N60W, some through going

2438) Og thin- to medium-bedded, fine-grained dolomite; horizontal; f: Moderately spaced N50E, N15E, N75W

2439) Og thin- to medium-bedded, fine-grained dolomite; horizontal; f: moderately spaced N5E, N65W, **through going**

2440) Og thick-bedded but thin-banded chert; horizontal; holds up small 12' waterfall; f: widely spaced N10E, N40W

2441) Og thin-bedded, fine- to medium-grained dolomite and

interbedded chert; horizontal; f: closely to widely spaced N50E, N20E, N30W (spacing varies from bed to bed)

2442) Og thin- to medium-bedded, fine-grained dolomite, with thin chert layers and lenses less than 1" thick; horizontal; f: closely spaced N25E, N55W

2443) Og medium- to thick-bedded, fine- to medium-grained dolomite, mostly mossed over; horizontal; f: closely to moderately spaced N35E, N25W, **through going**

2444) Og thin-bedded, fine-grained dolomite; horizontal; f: closely spaced, randomly oriented, pervasive

2445) Og thin-bedded, fine-grained dolomite, with thin 1" lenses and layers of chert; horizontal; f: closely spaced N25E, N40W

2446) Og thin- to medium-bedded, fine-grained dolomite, with thin chert interbeds, tan; horizontal; f: closely spaced N30E, N85W

2447) Og thick bed of chert at about 830' elev.; horizontal; f: closely spaced N60E, N30W

2448) Og thin-bedded, fine-grained dolomite; yellowish-brown; interbedded with thin chert layers; horizontal; f: closely spaced N60E, N25E, N20W, N55W; Ogu/Ogl contact at or above 820' elev.

2449) Og chert, poorly exposed; just upstream is dolomite bed, probably thick but only top exposed; horizontal; f: chert pervasively and randomly fractured, dolomite has closely spaced N30E, N75W, fracture depths indeterminate

2450) Og thin-bedded, fine- to medium-grained dolomite; horizontal; f: closely spaced N70E, N20E, **through going**

2451) Og medium- to thick-bedded, fine- to medium-grained dolomite interbedded with chert; horizontal; f: chert, pervasively and randomly fractured; dolomite, closely to moderately spaced N20E, N55W

2452) Og thin-bedded, fine- to medium-grained dolomite; horizontal; f: closely spaced N10E, widely spaced N50W,both **through going**

2453) Og thin- to medium-bedded, fine- to medium-grained dolomite, with lenses of chert scattered throughout; horizontal; f: moderately spaced N25E, N80W

2454) Og medium- to thick-bedded, fine- to medium-grained; horizontal; f: widely spaced N75E, N10E

2455) Og thick-bedded, fine- to medium-grained dolomite; horizontal; f: closely spaced N10E, N70W

2456) Or thin- to medium-bedded, fine- to coarse-grained basal sandstone; horizontal; f: closely to moderately spaced N70E, N10E; Or/Og at 950' elev.

5/22/95 Big Piney 7 1/2' quadrangle

2457) colluvium/residuum; rubble filled gulley, no outcrop

2458) Og medium-bedded, fine- to medium-grained dolomite, interbedded with chert; horizontal; f: chert pervasively and closely fractured, dolomite widely spaced N15W, N70W

2459) Og thick bed of chert; horizontal; f: closely spaced N30E, N30W

2460) Og medium-bedded, fine- to medium-grained dolomite, interbedded with chert; horizontal; f: chert pervasively and closely fractured, dolomite closely spaced N30E, N40W, N85W

2461) Qal distinct terrace present above 10' high scarp at edge of floodplain; terrace flat near floodplain but swoops upward into talus slopes at edge of valley wall bluff

2462) colluvium; talus slope covers lower half of valley wall bluff

2463) Og thick-bedded, fine- to medium-grained dolomite with lenses and layers of chert; thick beds form prominent stair-stepped ledges with vuggy surfaces and scattered small caves; rubbly slopes between ledges appear to be thinner layers of dolomite and chert interbedded; horizontal; f: closely to widely spaced N40E, N5E, N70W, a few through going but most not

2464) Qal terrace noted at 2461 reappears between floodplain and valley wall

2465) Og thick bed of fine-grained, yellowish-brown dolomite; vuggy and mossy; horizontal; f: closely spaced N35E, N20W, N75W, depth of fractures unknown

2466) Og thick-bedded, medium- to coarse-grained dolomite with some chert layers interbedded, surface vuggy and mossy; horizontal; f: closely to moderately spaced N55E, N45W, **through going**

2467) Og thick-bedded, fine- to medium-grained, gray dolomite interbedded with massive chert, mossy; horizontal; f: chert pervasively and closely fractured, dolomite closely to moderately spaced N40E, N5W, N60W, some through going

2468) colluvium/residuum; rubble filled gulley, no outcrop but many large chaotic blocks scattered about

2469) colluvium/residuum rubble filled gulley, no outcrop

2470) colluvium slumped bluff, no outcrop despite road cut across bluff face

2471) colluvium slumped bluff, no outcrop despite road cut across bluff face

2472) Og thick bed of chert, mossy; horizontal; f: closely spaced N60E, N20W fracture depths unknown

2473) Og thick bed of chert, mossy; horizontal; f: moderately spaced, N30E, N25W, N60W

2474) Og thick bed of chert exposed in stream bottom; horizontal; f: closely spaced N45E, N20W, N70W, fracture depths unknown

2475) colluvium/residuum upper part of gulley choked with rubble, no outcrop

2476) colluvium gulley choked with rubble, no outcrop

2477) Og thick bed of chert; horizontal; f: closely spaced N80E, N35W, fracture depths unknown

2478) colluvium slumped bluff covered with talus; no outcrop visible but high outcrops may have been hidden by tree canopy

2479) colluvium; gulley filled with rubble, no outcrop but spring eminates at about 980' elev.

2480) Or thin- to medium-bedded, medium- to coarse-grained quartz sandstone; horizontal; f: closely spaced N20E, N15W, N70W; Or/og at 950' elev.

2481) Og thick-bedded, medium- to coarse-grained dolomite interbedded with chert; holds up small waterfall; horizontal; f: moderately spaced N60E, N30E, N50W

2482) Og thick-bedded, medium-grained dolomite; vuggy surface with small caves; horizontal; f:moderately spaced N80E, N10W, **through going**

2483) Og medium-bedded, fine- to medium-grained dolomite; horizontal; f: closely to moderately spaced N80E, N30E, N55W

2484) Og thin-bedded chert; horizontal; f: closely spaced N50E, N-S, N70W

2485) Og medium-bedded, medium- to coarse-grained dolomite; vuggy and mossy surface; horizontal; f: closely spaced N60E, N-S, N40W

2486) Og thin-bedded dolomite, fine- to medium-grained dolomite and light-gray, and chert; horizontal; f: closely spaced N75E, N15E, N60W

2487) Og thin-bedded, fine- to medium-grained dolomite; horizontal; f:closely to moderately spaced N80E, N20E, N25W, N40W, fracture depths unknown

2488) Og thin-bedded, fine- to medium-grained dolomite and chert; horizontal; f: closely spaced N30E, N25W

2489) Og thin-bedded, fine- to medium-grained dolomite and chert; horizontal; f: closely spaced N15E, N50W, E-W

2490) Og thin-bedded, fine- to medium-grained dolomite and chert; horizontal; f: closely spaced N85E, N20E, N45W

2491) colluvium; covered bank with spring eminating, 4-5 gallons per minute flow

2492) Og small outcrop of thin-bedded, medium-grained dolomite; horizontal; f: closely to moderately spaced N75E, N15W, N45W, fracture depths unknown

2493) Og thin-bedded, fine- to medium-grained dolomite; 5' outcrop over small shallow cave; horizontal; f: moderately spaced N85E, N15E

5/23/95 Devils Elbow 7.5' Quadrangle

2494) Or thin-bedded, fine-grained quartz sandstone; N75E 16°NW, stream bed lies on top of this bed; f: closely spaced N55E, N30W, normal to bedding, **through going**; Or/Og slopes up from 945 to 955' elev.

2495) Og thin-bedded, medium-grained dolomite; horizontal; f: closely spaced N80E, NS, N35E, N75W

2496) Og thin- to medium-bedded, fine- to medium-grained dolomite; horizontal; f: closely spaced N70E, N5E; Or/Ogu not exposed but Ogu extends up bank to 1000'elev., Or/Ogu estimated to be about 1005'

2497) Or medium-bedded, fine- to medium-grained quartz sandstone; horizontal; apparently basal Or sandstone, so Or/Ogu placed at 955' elev.

2498) Or thin-bedded, fine- to medium-grained sandstone; horizontal; Or/Ogu at 955' elev.

2499) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; horizontal; basal sandstone overlies long outcrop of poorly exposed Og dolomite, Or/Og at about 1010' elev.

2500) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; N30W 35°NE; f: closely spaced N40E, N50W, normal to bedding, **through going**

2501) water in creek bed appears and then quickly disappears at

this point and does not reappear until somewhere below 2500) data point

2502) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; overlies thinly interlaminated dolomite and chert that seems to form on thick, intensely brecciated and recemented layer which was subsequently refractured **(fault?)**; rolling bedding surface, near northwest end outcrop attitude is N85W 24°SW on bed with asymmetrical ripple crests trending N15E and current flow towards NW, further southeast and just west of downside of fault, fractured bedding has N25E 42°NW attitude; f: chert intensely brecciated, sandstone closely spaced E-W, N50E, N15W, **through going** (especially N15W set); fault in breccia N55E 70°NW

2503) water in creek is deep all along this stretch, but then simply disappears and stream bed is dry down to 2501) data point

2504) Or medium-bedded, fine- to medium-grained basal sandstone; approximately horizontal but slightly slumped downhill from slope failure, Or/Ogu estimated to be at 945' elev.

5\24/95 Bloodland 7.5' Quadrangle

2505) Or dolomite and chert interbedded; at west end of outcrop beds are nearly horizontal, but to east beds roll toward fault zone beneath stream and have N10E 24°SE attitude

2506) Or thin-bedded, fine- to medium-grained quartz sandstone; mud cracks and symmetrical ripple mark crests on two beds (one trending N25W and the other N35E); N85W 20°NE (measured 400' south of bridge); f: closely spaced N70E, N25W, **through going**

2507) Or thin-bedded, fine- to medium-grained quartz sandstone; N70W 12°SW (measured 300 feet north of bridge); f: closely spaced N60E, N35W, **through going**

2508) Or thin-bedded, fine- to medium-grained quartz sandstone; symmetrical ripple marks with crests trending N50E; N20W 15°NE; f: closely spaced N30E, N30W

2509) Or thin-bedded chert, thinly laminated, exposed in stream

bank; about horizontal; f: closely spaced N5E, N80W, **through going**

2510) ditch with no outcrop, lots of water and water flow in this interval

Big Piney 7.5' Quadrangle

2511) Or thick bed of fine- to medium-grained, massive sandstone; forms 15' cliff; top of thick bed at 1080' elev.

5/25/95 Waynesville 7.5' Quadrangle

2512) residuum roadside sandstone and quartzite float abundant here, no sandstone or quartzite below this level; Or/Ogu estimated at 1010' elev.

2513) Or thin- to medium-bedded, fine- to coarse-grained orthoquartzite; horizontal; contact with underlying Og well exposed, Or/Ogu at 1000' elev.

2514) Or thin- to medium-bedded, fine- to coarse-grained quartz sandstone; horizontal; contact with underlying Og fairly well exposed, Or/Og at about 960' elev.

2515) Or thin- to medium-bedded, fine- to coarse-grained quartz sandstone; horizontal; contact with underlying Og poorly exposed on hillslope beneath power line, Or/Og at about 970' elev.

2516) Or thin- to medium-bedded, fine- to coarse-grained orthoquartzite; horizontal; contact with underlying Ogu fairly well exposed on road and on roadbank, Or/Ogu at about 970' elev.

Devils Elbow 7.5' Quadrangle

2517) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; approximately horizontal; poorly exposed contact with Ogu on road and roadside, Or/Ogu at about 950' elev.; north of mapped area

2518) Or thin- to medium-bedded, fine- to medium-grained quartz sandstone; approximately horizontal; well exposed contact with Ogu

on roadside, elev. about 945' elev.

2519) Or thin- to medium-bedded, fine- to coarse-grained orthoquartzite; approximately horizontal; well exposed contact with Og in ditch on SW side of road, Or/Og at about 940' elev.; north of mapped area

2520) Og medium-bedded chert; approximately horizontal; exposed along road but no sign of quartzite or sandstone; north of mapped area

2521) Or thin-bedded, fine- to coarse-grained sandstone; probably about horizontal; caps hill top, Or/Ogu probably about 1000' elev. but no good outcrop is present; north of mapped area

2522) Or medium-bedded, fine- to coarse-grained orthoquartzite; about horizontal; basal bed exposed in roadbed, Or/Ogu at about 1000' elev.

2523) Or medium-bedded, fine- to coarse-grained orthoquartzite; about horizontal; basal bed exposed in roadbed, Or/Ogu at about 1000' elev.

Appendix B. Drill hole logs; map ID #'s are from Missouri Division of Geology and Land Survey files except for SW-36 holes in Bloodland quadrangle from U.S. Army files; all elevations are in feet above average mean sea level. (1) Elevation taken from topographic map.

OB-Overburden- residuum, colluvium, and alluvium
Ojc-Jefferson City Formation
Or-Roubidoux Formation
Og-Gasconade Dolomite
O€e-Eminence Dolomite
€p-Potosi Dolomite
€dd-Doe Run and Derby Formations, undivided
€d-Davis Formation
€b-Bonneterre Formation

Map ID #	Loc.	Collar elev.	Contact elev.		Bottom elev.
Waynesville 7 ½' quadrangle					
19535	SE1/4SW1/4 sec26,T36N R12W	834	OB-Og	819	
			Og-O€e	589	
			O€e-€p	319	
			€p-€dd	74	59
27469	NW1/4NE1/4 sec34,T36N R12W	880	OB-Og	865	
			Og-O€e	580	
			O€e-€p	315	
			€p-€dd	70	
			€dd-€d	-50	-75
	Geochemical data of Erickson and others (1985) indicates anomalous high amounts of Pb, Co, and Ni in this hole				
25277	SE1/4NE1/4 sec25,T36N R12W	1005	OB-Or	990	
			Or-Og	955	
			Og-O€e	645	
			O€e-€p	340	
			€p-€dd	105	
			€dd-€d	10	-25
21773	SE1/4SW1/4	1173	OB-Ojc	1158	

	sec32,T34N R12W		Ojc-Or Or-Og	1108 983	 852
13807	NE1/4SW1/4 sec34,T36N	935	OB-Or Or-Og	920 910	 730
16342	NE1/4NW1/4 sec34,T36N R12W	885	OB-Og	800	735
17170	NE1/4NE1/4 sec34,T36N R12W	862	OB-Og	827	762
18208	NW1/4NE1/4 sec34,T36N R12W	871	OB-Og	846	721
6780	SW1/4NE1/4 sec34,T36N R12W	910	OB-Og	890	723
21217	NE1/4SW1/4 sec34,T36N R12W	933	OB-Og	913	733
11016	NW1/4NE1/4 sec27,T36N R12W	1020	OB-Or Or-Og	1000 940	 765
6706	NE1/4NE1/4 sec26,T36N R12W	845	Og		744
6827	SW1/4NE1/4 sec26,T36N R12W	835	OB-Og	813	731
6806	NW1/4SE1/4 sec24,T36N R12W	781	OB-Og	756	669
6838	NW1/4SE1/4	803	OB-Og	788	720

	sec24,T36N R12W				
6869	NW1/4NE1/4 sec29,T36N R11W	1060 (1)	OB-Or Or-Og	1040 960	694
11954	SE1/4NW1/4 sec29,T36N R11W	1061 (1)	OB-Or Or-Og	1041 926	691
13371	SW1/4NE1/4 sec29,T36N R11W	1071	OB-Or Or-Og	1051 961	686
12760	SW1/4NE1/4 sec29,T36N R11W	1100	OB-Or Or-Og Og-O€e	1010 1000 725	698
13033	NE1/4NW1/4 sec29,T36N R11W	1047	OB-Or Or-Og	1022 927	645
6626	centerNW1/4 sec29,T36N R11W	1062	OB-Or Or-Og	1042 947	696
17317	NE1/4NE1/4 sec30,T36N R11W	1063	OB-Ojc Ojc-Or Or-Og Og-O€e O€e-€p	1043 1028 923 623 338	118
27151	SE1/4SE1/4 sec32,T36N R11W	1050	OB-Og Og-O€e	985 715	655
11946	NE1/4NE1/4 sec30,T36N R11W	1072	OB-Ojc Ojc-Or Or-Og	1047 1032 907	797
6831	SE1/4NE1/4 sec31,T36N	1050 (1)	OB-Or Or-Og	1020 925	

	R11W		Og-O€e	610	
			O€e-€p	330	249
7431	SE1/4SE1/4	1112	OB-Or	1087	
	sec33,T36N		Or-Og	1047	
	R11W		Og-O€e	742	
			O€e-€p	462	312
6792	SE1/4NW1/4	1097	OB-Or	1077	
	sec33,T36N		Or-Og	1007	730
	R11W				
15065	NW1/4SE1/4	1077	OB-Og	1002	
	sec33,T36N		Og-O€e	717	660
	R11W				
15447	NW1/4SE1/4	1083	OB-Or	1048	
	sec33,T36N		Or-Og	1018	
	R11W		Og-O€e	718	683
18319	SW1/4NE1/4	1088	OB-Og	1028	696
	sec33,T36N				
	R11W				
20696	NE1/4NW1/4	1087	OB-Og	975(?)	
	sec34,T36N		Og-O€e	742	737
	R11W				
26950	NE1/4SW1/4	1068	OB-Or	1048	
	sec33,T36N		Or-Og	993	
	R11W		Og-O€e	703	
			O€e-€p	408	318
23787	NW1/4NW1/4	1093	OB-Og	1008	
	sec27,T36N		Og-O€e	748	
	R11W		O€e-€p	463	
			€p-€dd	153	118
15310	NE1/4NW1/4	1097	OB-Og	1042	
	sec27,T36N		Og-O€e	737	692
	R11W				

18322	SW1/4NW1/4 sec27,T36N R11W	1075	OB-Og	1035	
			Og-O€e	715	555
10960	NW1/4NW1/4 sec27,T36N R11W	1091	OB-Og	1041	832
28543	NE1/4NW1/4 sec28,T36N R11W	1152	OB-Or	1112	
			Or-Og	1032	
			Og-O€e	702	
			O€e-€p	452	
			€p-€dd	217	
			€dd-€d	137	52
16044	NE1/4SE1/4 sec28,T36N R11W	1090	OB-Or	1005	
			Or-Og	1000	
			Og-O€e	720	665
18323	SW1/4SE1/4 sec28,T36N R11W	1104	OB-Or	1059	
			Or-Og	1029	729
8296	NE1/4NW1/4 sec28,T36N R11W	1133	OB-Or	1098	
			Or-Og	1053	
			Og-O€e	728	681
7828	NE1/4SW1/4 sec28,T36N R11W	1090	OB-Og	1055	723
3781	NE1/4NW1/4 sec28,T36N R11W	1139	OB-Or	1114	
			Or-Og	1054	789
18526	SE1/4SW1/4 sec28,T36N R11W	1074	OB-Og	1024	
			Og-O€e	729	654
12425	NE1/4SW1/4 sec28,T36N R11W	1090 (1)	OB-Or	1080	
			Or-Og	1045	
			Og-O€e	745	680

20685	SW1/4NE1/4 sec11,T35N R12W	916	OB-Og	876	716
10915	NE1/4NE1/4 sec11,T35N R12W	897	OB-Og	882	847
16046	NE1/4NW1/4 sec14,T35N R12W	1021	OB-Or	1001	
			Or-Og	921	701
15313	SE1/4SE1/4 sec4,T35N R12W	1082	OB-Ojc	1062	
			Ojc-Or	1037	
			Or-Og	927	629
20911	NE1/4NE1/4 sec4,T35N R12W	1044	OB-Or	1014	
			Or-Og	939	
			Og-O€e	614	594
7129	SW1/4NE1/4 sec23,T35N R12W	879	Og		719
18423	NE1/4NE1/4 sec23,T35N R12W	850	OB-Og	825	
			Og-O€e	635	630
13623	SW1/4NE1/4 sec2,T35N R12W	927	OB-Og	902	757
15067	NE1/4NW1/4 sec11,T35N R12W	1070	OB-Or	1040	
			Or-Og	965	775
18486	SE1/4SE1/4 sec2,T35N R12W	1071	OB-Or	1041	
			Or-Og	926	741
19806	NW1/4NE1/4 sec3,T35N R12W	1000	OB-Or	975	
			Or-Og	895	650

12918	SE1/4NW1/4 sec3,T35N R12W	969	OB-Or	964	
			Or-Og	879	679
16048	SW1/4NW1/4 sec3,T35N R12W	1040	OB-Or	1005	
			Or-Og	925	688
12919 13630	SW1/4NW1/4 sec3,T35N R12W	1045	OB-Or	1015	
			Or-Og	910	695
21582	NE1/4NW1/4 sec3,T35N R12W	1047	OB-Or	1007	
			Or-Og	927	
			Og-O€e	592	482
7849	SW1/4NW1/4 sec33,T36N R11W	1070	OB-Og	1015	720
14235	NW1/4NE1/4 sec31,T36N R11W	802	OB-Og	777	747
15292	NW1/4SE1/4 sec28,T36N R11W	1069	OB-Og	989	
			Og-O€e	709	644
4486	SE1/4NE1/4 sec9,T35N R11W	1108	OB-Og	1053	858
17183	NE1/4NE1/4 sec4,T35N R11W	1121	OB-Og	1046	
			Og-O€e	731	651
26043	SE1/4NE1/4 sec9,T35N R11W	1125	OB-Or	1085	
			Or-Og	1055	
			Og-O€e	715	
			O€e-€p	435	
			€p-€dd	135	100
11952	SW1/4SW1/4	780	OB-Og	770	

	sec24,T35N R12W		Og-O€e O€e-€p	610 325	80

Bloodland 7 ½' quadrangle

6823	NW1/4SW1/4 sec6,T35N R12W	905	OB-Og	875	813
17116	NE1/4SE1/4 sec26,T35N R12W	1093	OB-Or Or-Og	1053 978	838
20453	SW1/4NE1/4 sec28,T34N R11W	1171	OB-Ojc Ojc-Or	1141 1126	1041
11407	SW1\4NW1/4 sec3,T34N R12W	920 (1)	OB-Og	905	830
4515	SW1/4SE1/4 sec22,T35N R11W	1164	no log to Og	994	809
4084	west center sec3,T34N R12W	1096	OB-Or Or-Og	1056 976	881
SW-36-01	SE1/4SW1/4 sec31,T35N R11W	1092	OB-Or Or-Og	1072 978	882
SW-36-02	SE1/4SW1/4 sec31,T35N R11W	1082	OB-Or Or-Og	1058 974	890
SW-36-03A SW-36-03	SW1/4SE1/4 sec31,T35N R11W	1072	OB-Or Or-Og	1062 961	905

SW-36-04	SW1/4SE1/4 sec31,T35N R11W	1066	OB-Or Or-Og	1053 960	881
28735	NE1/4SE1/4 S1/2sec5, T34N,R11W	~1145	OB-Ojc Ojc-Or Or-Og Og-O€e	1135 1045 935 580	453

Devils Elbow 7 ½' quadrangle

24218	NW1/4NE1/4 sec27,T36N R11W	1080 (1)	OB-Or Or-Og Og-O€e	1020 1015 695	625
19122	NE1/4NE1/4 sec27,T36N R11W	1053	Or-Og Og-O€e	968 698	629
6826	NE1/4NE1/4 sec27,T36N R11W	1083	Or-Og	1043	723
21225	NE1/4NW1/4 sec25,T36N R11W	771	OB-Og	746	671
18632	NE1/4SE1/4 sec25,T36N R11W	737 (1)	OB-Og	717	681
25211	NE1/4SW1/4 sec26,T36N R11W	1040	OB-Or Or-Og Og-O€e	1005 995 690	630
15449	SW1/4SE1/4 sec26,T36N R11W	921	OB-Og	871	700
22396	SE1/4NW1/4 sec26,T36N R11W	1060	OB-Or Or-Og	955(?) 950	750

16345	NW1/4NW1/4 sec26,T36N R11W	1086	OB-Or Or-Og Og-O€e	991(?) 981 686	661
21527	SE1/4NW1/4 sec35,T36N R11W	849	OB-Og	824	679
18633	NE1/4NE1/4 sec26,T36N R11W	813	OB-Og	803	698
281	NW1/4NW1/4 sec14,T35N R11W	1106	OB-Or Or-Og	1056 1036	906
7804	NE1/4NW1/4 sec2,T35N R11W	910	Og		809
7803	NE1/4NW1/4 sec2,T35N R11W	909	Og		807
7792	NE1/4NW1/4 sec2,T35N R11W	907	Og		704
7783	NE1/4NW1/4 sec2,T35N R11W	908	Og-O€e	698	658
15312	SE1/4SW1/4 sec2,T35N R11W	961	OB-Og	936	761

Big Piney 7 ½' quadrangle

28508	NW1/4SW1/4 sec17,T34N R10W	865	OB-Og Og-O€e O€e-€p €p-€dd	835 640 360 168	

				Cdd-Cd	-59	
				Cd-Cb	-259	-497
19520	NW1/4NW1/4 sec30,T34N R10W	964		OB-Og	924	739
7171	SE1/4SW1/4(?) sec5,T34N R10W	830	(1)	OB-Og	825	655
7173	NW1/4NE1/4 sec5,T34N R10W	912		OB-Og	907	689
25425	SW1/4NE1/4 sec4,T34N R10W	1090		OB-Or	1035	
				Or-Og	1020	715
17311	NW1/4NW1/4 sec12,T34N R11W	1115		OB-Or	1070	
				Or-Og	1015	770
2656	NE1/4NE1/4 sec15,T34N R11W	1143		Or-Og	1033	872
25247	NE1/4NE1/4 sec25,T35N R11W	780		OB-Og	755	
				Og-OCe	680	630
7884	NW1/4SE1/4 sec20,T35N R10W	867		OB-Og	837	
				Og-OCe	677	
				OCe-Cp	377	
				Cp-Cdd	77	44
25242	NW1/4NW1/4 sec31,T35N R10W	810		OB-Og	780	
				Og-OCe	684	
				OCe-Cp	330	100

Brownfield 7 ½' quadrangle

20466	NW1/4SW1/4 sec21,T35N R12W	1045	OB-Or Or-Og	1010 945	800
15316	NE1/4SE1/4 sec32,T35N R12W	1150	OB-Ojc Ojc-Or Or-Og	1140 1130 990	945
16042	NW1/4SE1/4 sec29,T33N R12W	1097	no log to 902 Og		692

Winnipeg 7 ½' quadrangle (all holes are west of mapped area)

18940	SE1/4NW1/4 sec17,T33N R12W	1293	OB-Ojc Ojc-Or Or-Og	1238 1183 1038	953
21773	SE1/4SW1/4 Sec32T34N R12W	1173	OB-Ojc Ojc-Or Or-Og	1158 1108 983	902

Roby 7 ½' quadrangle

26989	NW1/4SW1/4 sec10,T33N R12W	1167	OB-Ojc Ojc-Or Or-Og	1147 1137(?) 995	892
22581	SW1/4SW1/4 sec10,T33N R11W	1336	OB-Ojc Ojc-Or Or-Og	1286 1231 1096	906
26167	NW1/4SW1/4 sec10,T33N R11W	1335	OB-Ojc Ojc-Or Or-Og	1265 1225 1075	1060
25979	SE1/4NE1/4 sec3,T33N R11W	1284	OB-Or Or-Og	1214 1099	884

2772	SW1/4SE1/4 sec28,T34N R11W	1182	adjusted	OB-Ojc	1179	
				Ojc-Or	1112	957