Arkansas Geological Survey
Bekki White, State Geologist and Director

Geologic Map of the Sylamore Quadrangle, Izard and Stone Counties, Arkansas

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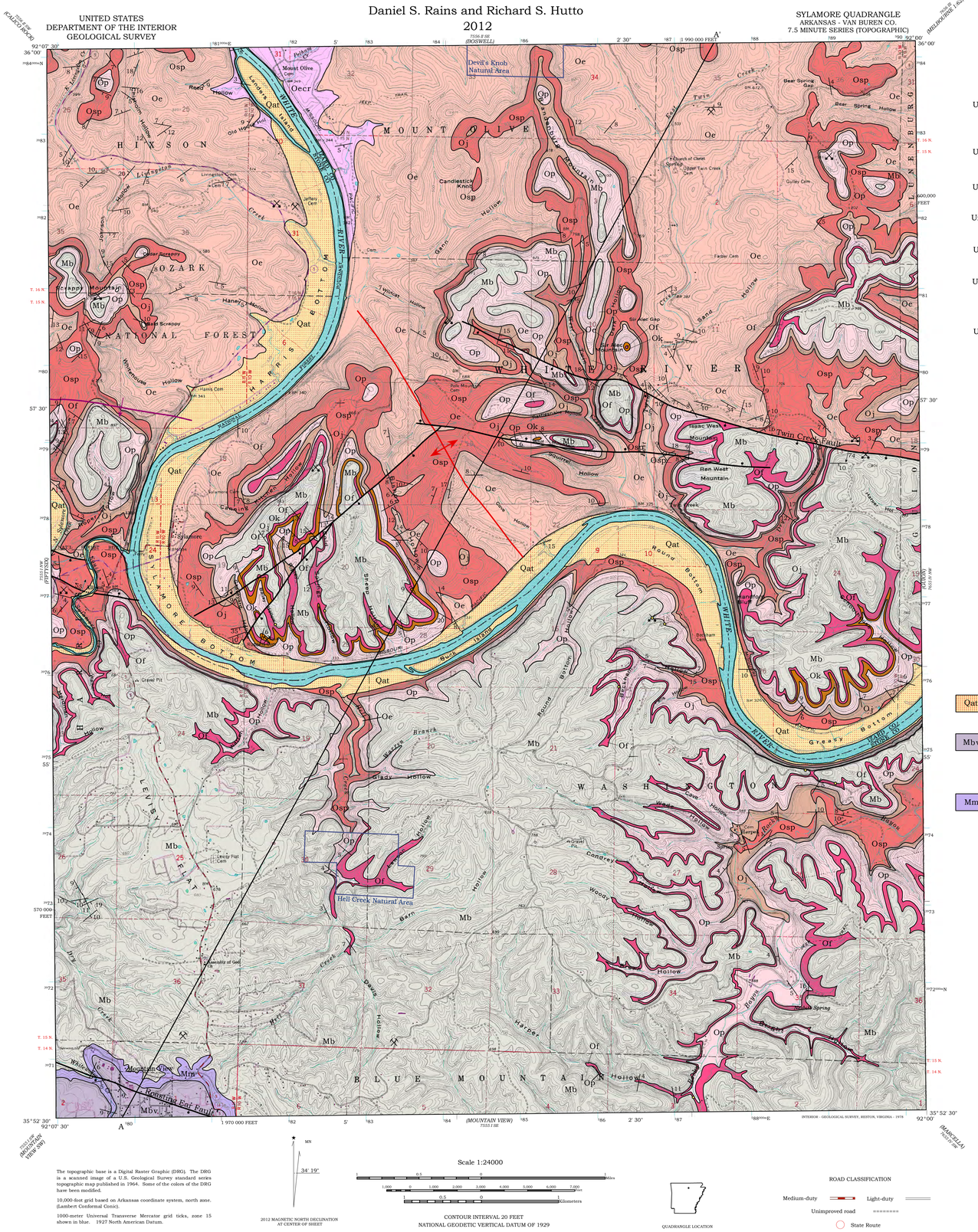
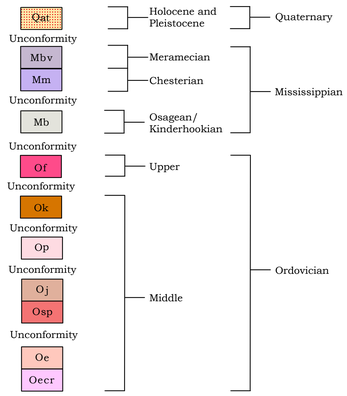
2012

Digital Geologic Quadrangle Map
Sylamore Quadrangle
DGM-AR-00844



Correlation of Map Units



Introduction

This map depicts the bedrock geology of the Sylamore 7.5 minute topographic quadrangle of Stone and Izard counties, Arkansas. In this area over 1700 ft (518 m) of carbonate and clastic sedimentary rocks of Middle Ordovician to Late Mississippian age (approximately 470 – 320 Mya) are exposed.

Illustration of the geology of the Sylamore quadrangle was complicated by a lack of lateral persistence of some rock units. In areas where the Kimmswick Limestone (Ok) is too thin to be depicted at the scale of the map, it is combined into a single map unit with the Fernvale Limestone (Of). This convention was also followed for the Plattin and Joachim formations. Where the Joachim Dolomite is too thin to be depicted it is combined with the Plattin Limestone and they are depicted as a single unit (Op).

The geology of the Sylamore quadrangle was mapped in 1973 by E.E. Glick of the USGS for the 1:500,000 scale geologic map of Arkansas. This map builds on previous work but uses more detailed stratigraphy and depicts structure in greater detail. The geologic information on this map is based on field observations made between July 2011 and April 2012. Data collection sites were recorded using a Garmin GPSmap 76S global positioning satellite receiver. Bedrock dipping at less than 2° is depicted as horizontal.

Description of Map Units

Qat **Alluvial and terrace deposits (Quaternary)** – Unconsolidated clay, silt, sand and gravel deposited by major streams and covering bedrock.

Mbv **Batesville Sandstone (Chesterian)** - Typically consists of very fine- to fine-grained, thin- to thick-bedded silty sandstone. Brownish-gray on fresh surfaces. Buff to brown on weathered surfaces. Commonly cross-bedded. Solution vugs common near base. Rarely calcareous near top. 0 - 120 ft (0 - 37 m) thick. Conformable with the underlying Moorefield Formation

Mm **Moorefield Formation (Meramecian)** - Typically consists of silty shale and limy siltstone. The shale is brown on fresh surfaces, tan on weathered surfaces and locally calcareous. The limy siltstone is medium to dark gray fresh, tan to brown weathered and thin-bedded. Ranges from 60 – 80 ft (18 – 24 m) thick. Appears to be unconformable with the underlying Boone Formation.

Mb **Boone Formation (Osagean)** - Typically consists of thick-bedded, fine-granular to coarse-bioclastic limestone interbedded with chert in nodules and anastomosing beds. Limestone is usually gray fresh and weathered. Common fossils include crinoids and brachiopods though others have been noted (see McFarland, 2004). Phosphate pebbles and pyrite crystals are rare. Chert is commonly white to gray on fresh and weathered surfaces, but weathers tan locally. Geomorphology is characterized by erratic rolling hills with abundant sinkholes and springs, covered by unconsolidated regolith, composed primarily of red clay, and chert gravel.

St. Joe Limestone Member (Kinderhookian to Osagean) Poorly exposed or absent. Where recognized, it consists of less than 2 feet of bioclastic, coarse- grained limestone. Gray fresh with faint pink and green- mottles. Gray on weathered surfaces. Phosphate pebbles and pyrite nodules are common. Manganese dendrites, calcite vugs and the absence of chert distinguish it from the upper Boone formation. Locally there is a pinkish- to light brownish-gray, fine- to medium-grained chert- and sandstone-pebble-conglomerate, up to 2 ft (.6 m) thick at the base. Undifferentiated Silurian and upper Ordovician rocks are also included in the Boone Formation because they are too thin and localized to be depicted separately. These consist primarily of red-mottled, gray micritite with fossil fragments and pyrite inclusions (Lafferty Limestone), and dark red to pale green conglomeratic sandstone and siltstone with shale interbeds and dark red and gray algal buttons (Cason shale). Where present these are noted with a yellow dot (see Symbols). Total thickness of the Boone Formation up to 400 ft (122 m). Unconformable with the underlying Ordovician units.

Of **Fernvale Formation (Upper Ordovician)** - Typically massive, coarse-grained, fossiliferous limestone. Gray to white with pink mottles on fresh surfaces. Weathered outcrops are characteristically rounded, moss- covered, and friable. Fossils are mostly indistinct fragments although barrel-shaped crinoid segments are a notable exception. Ranges from 0-80 ft (0-30 m) thick. Unconformable with the underlying Kimmswick or Plattin formation.

Ok **Kimmswick Limestone (Middle Ordovician)** - Typically fine-grained, bioclastic limestone with micritic zones. Limestone is gray to white fresh with characteristic "sugary" appearance. Gray weathered. Micrite is gray both fresh and weathered. Outcrop locally splits into "nuggets" approximately 2 – 3 inches in diameter when struck with a hammer presumably due to the stylolites. Rare phosphate pebbles, chert lenses, and sinkholes. 0 – 40 ft (12 m) thick. Unconformable with the underlying Plattin Formation.

Op **Plattin Limestone (Middle Ordovician)** - Typically thin- and flat-bedded micrite. Light- to medium- gray on fresh surfaces and light-gray weathered. Common clear to white calcite blebs. Rare buff to light-yellow, very fine-granular limestone interbeds. Rare calcareous greenish-gray shale interbeds near base. Common well-developed karst features including disappearing streams, caves, sinkholes and springs. Springs are very common along the lower contact with the Joachim Formation. Local rare fossil fragments include corals, gastropods, and bryozoans. 40 – 180 ft (12 – 55 m) thick. Unconformable with the underlying Joachim Formation.

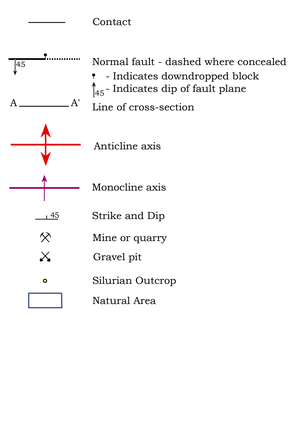
Oj **Joachim Dolomite (Middle Ordovician)** - Typically very fine granular dolostone with local interbedded fine- to medium-grained sandy limestone. The dolostone is tan to buff to gray on fresh surfaces and weathers light gray. The sandy limestone is gray on fresh and weathered surfaces. Ranges from very thin- to thick-bedded. Common small clear calcite vugs. The upper dolostone locally contains relatively larger calcite veins that stand in relief on weathered surfaces. The lower Joachim Dolomite locally contains breccia units composed of calcareous sandstone with angular dolostone rip-up clasts. Rare karst features include springs and sinkholes. Ranges from 5 – 140 ft (1 – 43 m) thick. Conformable with the underlying St. Peter Formation.

Osp **St. Peter Sandstone (Middle Ordovician)** – Typically massive, fine- to medium-grained sandstone. White to buff on fresh surfaces. Brown to dark-greenish-gray to gray on weathered surfaces. Well-sorted and well-rounded. Locally contains minor clay. Faint thin- beds and cross-beds can be identified rarely. Usually calcareous and friable. Contains relatively resistant, cylindrical "sandstone pipes" ranging in diameter from approximately 4 in. to 3 ft (10 cm – 1 m). Springs and sinkholes are very common. Unconformable with the underlying Everton Formation. Ranges from 20 – 140 ft (6 – 43 m) thick.

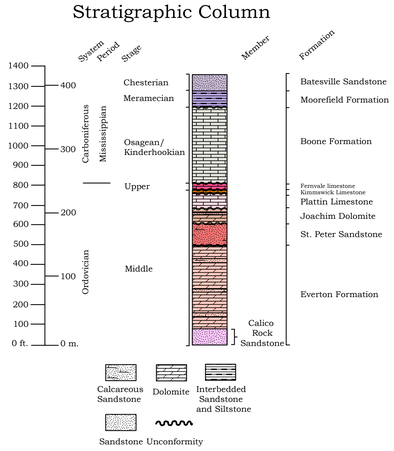
Oe **Everton Formation (Middle Ordovician)** – Consists of interbedded dolostone, limestone and sandstone. The dolostone and limestone are typically dark-gray on weathered surfaces and range from light-gray to light-greenish-gray on fresh surfaces. Texture is mostly very fine- to fine-granular and locally sandy. Calcite veins are common and quartz veins are rare. Typically very thin- to thin-bedded. Stromatolites are prevalent. Typically hummocky- to ripple-bedded and locally bioturbated. The sandstone is white to buff on fresh surfaces and gray weathered. Grains range from fine to medium and subangular to rounded. Typically calcareous. Ranges from thin- bedded to massive. Sandstone intervals vary in thickness from 1 inch to several feet and are interspersed throughout the formation although they are not abundant relative to the carbonate units. Up to 500 ft (152 m) thick. Conformable with the underlying Calico Rock Sandstone Member (Suhm, 1975).

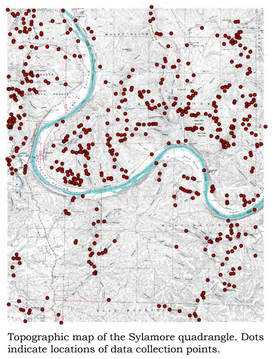
Oecr **Calico Rock Sandstone Member** - Calcareous, poorly-sorted, subangular sandstone. White to buff on fresh surfaces and gray weathered. Thin-bedded to massive. Stratigraphically positioned approximately 400 ft (122 m) below the top of the Everton Formation. Up to 100 ft (30 m) thick.

Symbols

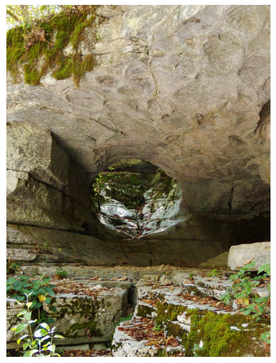


Stratigraphic Column



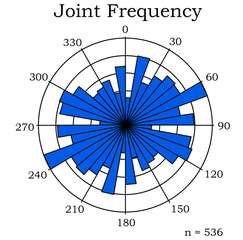


Topographic map of the Sylamore quadrangle. Dots indicate locations of data collection points.



Karst with scallop marks developed in Plattin Limestone, Hell Creek.

Joint Frequency



Rose diagram of strike frequency of joints recorded within the Sylamore Quadrangle.

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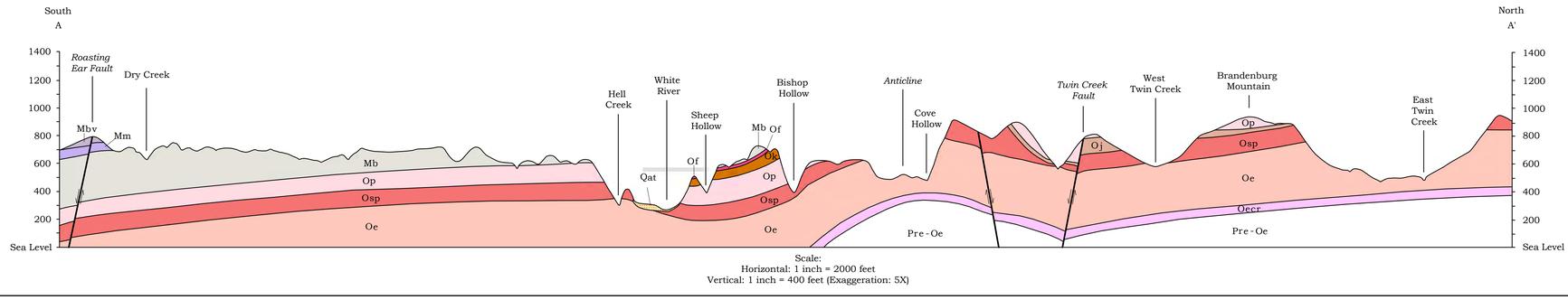

Scale:
Horizontal: 1 inch = 2000 feet
Vertical: 1 inch = 400 feet (Exaggeration: 5X)

Map and cross section digitized by Nathan Taylor