BEDROCK GEOLOGY OF SELMA QUADRANGLE
MONROE COUNTY, ILLINOIS

Illinois Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

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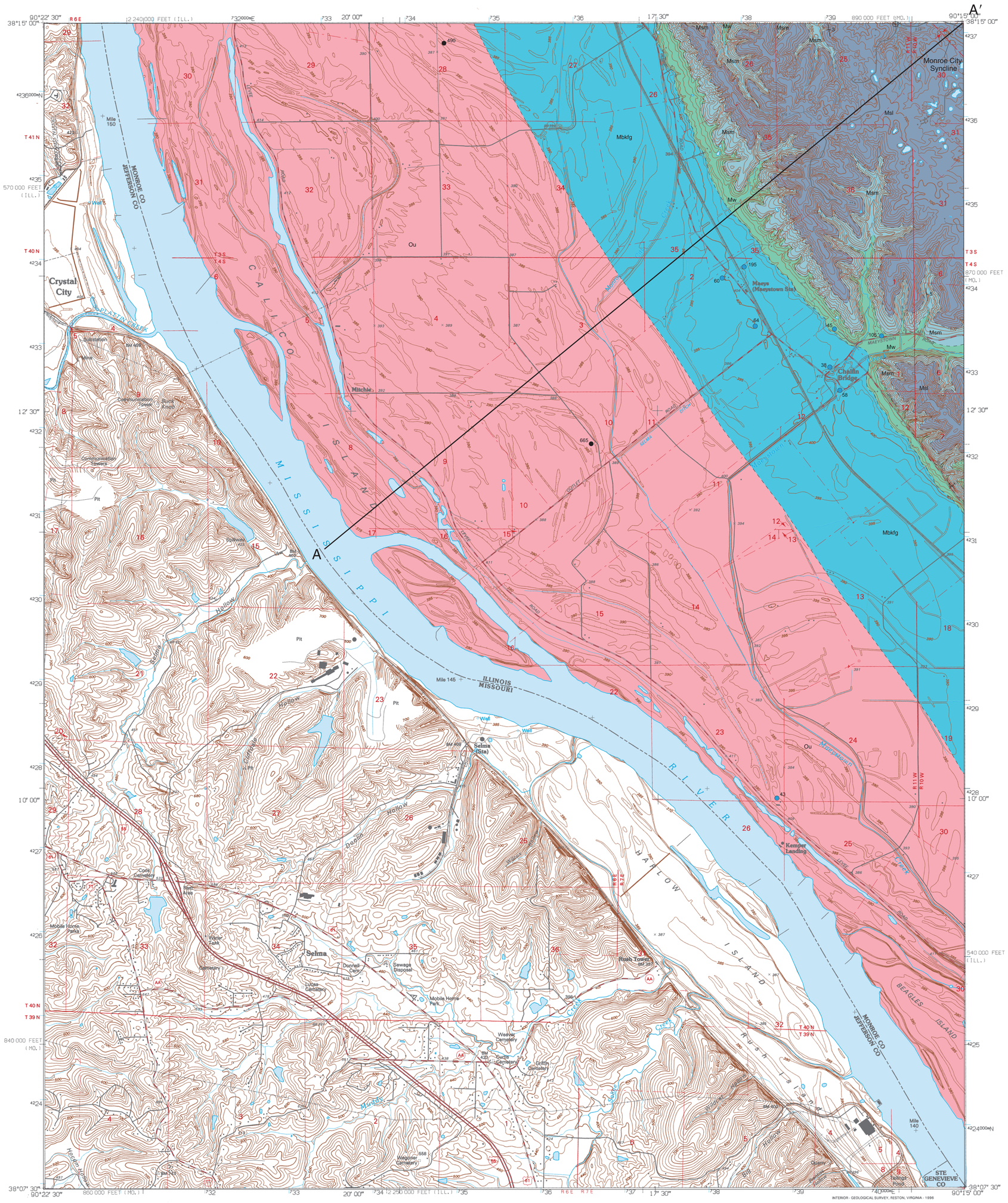
2002

STATEMAP Selma-BG



EXPLANATION

Mississippian	Msl	St. Louis Limestone	Valmeyeran
	Msm	Salem Limestone	
	Mw	Warsaw Shale	
	Mbkfg	Burlington and Keokuk Limestones and Fern Glen Formation	
	Unconformity		
Ordovician	Ou	Ordovician undifferentiated	Mohawkian

Symbols

- 40 — Strike and dip of bedding; number indicates degree of dip
- Horizontal bedding
- Abandoned quarry

Drill Holes
from which subsurface data were obtained

- Oil well
- Water well
- 109 — Numeric label indicates total depth of boring in feet.

Line Symbols
dashed where inferred

- Contact
- Syncline — direction of plunge indicated by arrows
- A—A′ — Line of cross section

Note: Well and boring records are on file at the ISGS Geological Records Unit and are available online from the ISGS Web site.

Base map compiled by Illinois State Geological Survey from digital data (Raster Featrue Separates) provided by the United States Geological Survey. Compiled from imagery dated 1962. Revised from imagery dated 1993. PLSS, survey control, contours and elevations current as of 1962. Map edited 1996.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Missouri (east zone) and Illinois (west zone) State Plane Coordinate system, (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 15

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SCALE 1:24,000

1 1/2 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

BASE MAP CONTOUR INTERVAL 20 FEET
SUPPLEMENTARY CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Released by the authority of the State of Illinois: 2002

Geology based on field work by B. Denny and J. Devera, 2001–2002.

Digital cartography by J. Domier, B. Denny, and S. Radil, Illinois State Geological Survey.

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This map has not undergone the formal Illinois Geologic Quadrangle map review process. Whether or when this map will be formally reviewed and published depends on the resources and priorities of the ISGS.

ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

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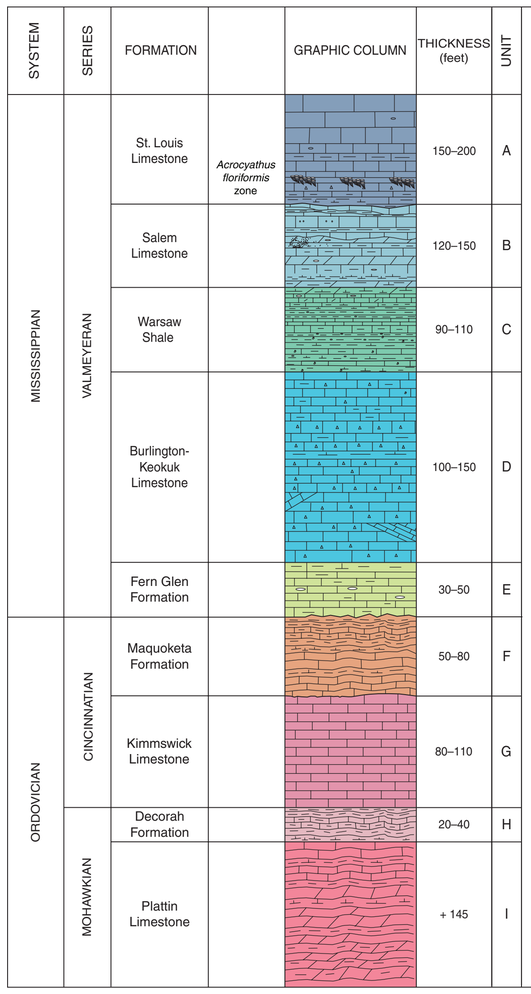
1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Herculaneum
2 Valmeyer
3 Waterloo
4 Festus
5 Renault
6 Halifax
7 Danby
8 Bloomsdale

APPROXIMATE MEAN DECLINATION, 2008

DRAFT:
THIS MAP HAS NOT BEEN REVIEWED AND IS NOT YET PUBLISHED



A St. Louis Limestone Limestone, siltstone, limestone breccia, and shale. Light-gray to medium-gray dense lime-mudstone with fossil wackestones. Part of the unit contains quartz sand and subangular limestone breccia clasts. Oolitic grainstones, greenish oncolitic packstones, peloidal grainstones, stromatolitic boundstones, carbonate intraclastic conglomerates make up a highly variable mix of microfacies. Yellowish dolostone beds are also present in this formation. Gray to dark-gray chert occurs as nodules and stringers. Siltstones are calcareous and greenish. The shales are greenish gray and reddish brown, calcareous, soft, and non-fissile. *Acrocyathus floriformis*, a colonial coral, occurs in the upper part of the basal portion of this formation. *Acrocyathus floriformis* is widespread near the base of the unit. The contact with the underlying unit is unconformable but difficult to identify due to lithologic similarities of the two units. The contact was placed about 20 feet below the lower *Acrocyathus floriformis* zone. Locally an erosional karstic surface can be observed between these units.

B Salem Limestone Limestone, dolomite, chert, and siltstone. Limestones are tan-brown to light gray and contain laminated tidallites, wackestones to grainstones composed of rounded and broken fossils and coated grains to gray lime-mudstones similar to the overlying St. Louis Limestone. Bedding styles range from tabular to undulatory. Cross-beds are present in grainstone facies. The unit has a dirty gray-brown grainy appearance. The diagnostic character of this formation is alternating beds of laminated, fine-grained (calcisiltite) facies with coarse bioclastic, peloidal to oolitic grains in shoaling-upward cycles. Dolomites are brown and have moldic porosity. Cherts are light gray and may be bioclastic and weather with a porous rind. Cherts occur between grainstones and laminated beds as elliptical nodules containing concentric rings that spall off like egg shells when weathered. Siltstones are brown to light gray and thinly bedded, typically less than 1 inch thick. Oolitic beds are rare. The *Foraminifera* fossil invertebrates include spiriferid and productid brachiopods, rugose corals, conularids, and crinoids. Ramose, fenestrate, encrusting, and bifoliate bryozoans are also present. The contact with the underlying unit is gradational.

C Warsaw Shale Dolomitic limestone, siltstone, and mudstone. Medium-gray, crinoidal, bryozoan wackestones and packstones that contain a few brachiopods. Dolostone beds are gray-brown, thinly bedded, and contain chlorite-rich shale clasts. The upper half of the unit is dominated by shaly limestone and dolostone beds. The lower half contains bluish gray mudstones up to 20 feet thick interbedded with thin lime-mudstones. Conularids and gastropods occur in the shaly portion of this unit and brachiopods, spirifers, bryozoans, and echinoderms are very common in the limestones and dolostones. Siltstones are calcareous and fossiliferous and thinly bedded in the lower part. The basal contact is poorly exposed but thought to be sharp and conformable with the underlying carbonate beds.

Subsurface Only

D Burlington and Keokuk Limestone Limestone, chert, siltstone, and shale. Light-gray to white crinoidal grainstones dominate and are interbedded with nodular and bedded light-gray to black cherts. The cherts, which comprise at least 25 percent of the lowermost beds are white when weathered, and some have bioclasts of crinoids and brachiopods. Sandy limestones weather light brown, are cross-bedded, and contain brachiopod and crinoid molds. The unit is characterized by alternating layers of light gray to white crinoidal grainstones with beds of argillaceous and sandy limestones. Large spirifers are common along with crinoids, bryozoans, and corals. Siltstones are dark gray with a greenish tint and are calcareous. The unit is conformable with the underlying unit.

E Fern Glen Formation Limestone, siltstone, and shale. Limestone is red to greenish gray, thin-bedded, and argillaceous; it contains small calcite geodes and crinoid stems. Green and red shaly calcareous siltstones are diagnostic. The cherts are greenish gray, nodular, and fossiliferous. The basal part is unconformable with the underlying formation.

F Maquoketa Formation Dolostone, siltstone, mudstone. This unit is poorly exposed and forms gentle hill slopes that are well vegetated. The lower part of the formation is calcareous and grades upward into bluish green, thin calcareous siltstones interbedded with bluish gray mudstones. The upper part is shaly buff-gray to greenish gray and has interlaminated silts and shales. This unit is unconformable with the underlying units.

G Kimmswick Limestone–Trenton Limestone in the subsurface Limestone, dolostone, and minor shale. White to gray, coarsely crinoidal grainstone is the dominant facies in this formation. Fossils include *Receptaculites* sp., *Illaenus* sp., *Isotelus gigas* (trilobites), brachiopods, and gastropods that are commonly broken in the cross-bedded coarse bioclastics of the formation. Shales are calcareous and may contain pyrite. Cherts are not very common and are white with slight yellow tones. When cracked, the limestones have a faint petroliferous odor. The basal contact is a distinct hardground omission surface.

H Decorah Formation Limestone and shale. Light brownish to greenish limestone or lime mudstone interbedded with organic-rich reddish brown shales. The cherts are dark gray, and the dominant fossils are strophominid brachiopods.

I Plattin Limestone Limestone, dolostone, and shale. Light brown to chocolate brown sublithographic limestone with alternating fossiliferous shales and sandy limestones near the base.

Introduction

This map has been constructed by using several data sources. Field outcrops were the primary source of data for the upland areas above the flood plain of the Mississippi River and boring records from the files of the Illinois State Geological Survey were the primary source of data for the Mississippi River area. Only four borings reached bedrock in the Mississippi River bottomland area. Therefore, the bedrock in the bottomland area has been projected and is subject to change as new data is aquired. All Quaternary units have been removed from the map in order to portray the bedrock geology.

The Kimmswick was formerly classified a subgroup of the Galena Group in Illinois. Missouri geologists recognize the Kimmswick as a Formation and the type section is just across the Mississippi River near the town of Kimmswick, Missouri. Nelson, Devera, and Masters (1995) formally reclassified the Kimmswick subgroup as a formation “Kimmswick Limestone” for the southern Illinois region.

Economic Geology

Stone
A few quarries once mined Mississippian limestones in the quadrangle. Currently, none of these operations are active and they probably supplied a local supply of building and fill material.

Oil
Two oil tests have been made in the quadrangle. Both of the wells drilled were dry holes.

Sand and Gravel
Sand and gravel are available in the alluvial deposits of the Mississippi River and talus from the toe of the bluff along the Mississippi River has been mined for construction fill material.

Structural Geology

The major structural feature of the quadrangle is the Monroe City Syncline (Weller 1939) which bisects the etreme northeast portion of the quadrangle. The Monroe City Syncline is a gentle northwesterly trending feature that parallels the west side of the Valmeyer Anticline (Denny and Jacobson 2008). The bedrock dips gently to the northeast throughout most of the quadrangle into the Monroe City Syncline. Dips are generally less than 5 degrees.

Acknowledgements

This research was supported in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program (STATEMAP) under USGS award number 01HQAG0103. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. This map was improved through review, suggestions, and comments by Dennis R. Kolata and Joseph A. Devera of ISGS.

References

Denny, F.B. and J.A. Jacobson, 2008, Geology of Valmeyer Quadrangle: Illinois State Geological Survey, Illinois Preliminary Geologic Map Series, IPGM Valmeyer-BG, 1:24,000.

Nelson, W.J., J.A. Devera, and J.M. Masters, 1995, Geology of the Jonesboro 15-minute Quadrangle, southwestern Illinois; Illinois State Geological Survey, Bulletin 101, 57 p.

Weller, J.M., 1939, Preliminary geological maps of the Pre-Pennsylvanian formations in part of southwestern Illinois: Illinois State Geological Survey, Report of Investigations - NO.59, 15 p.