

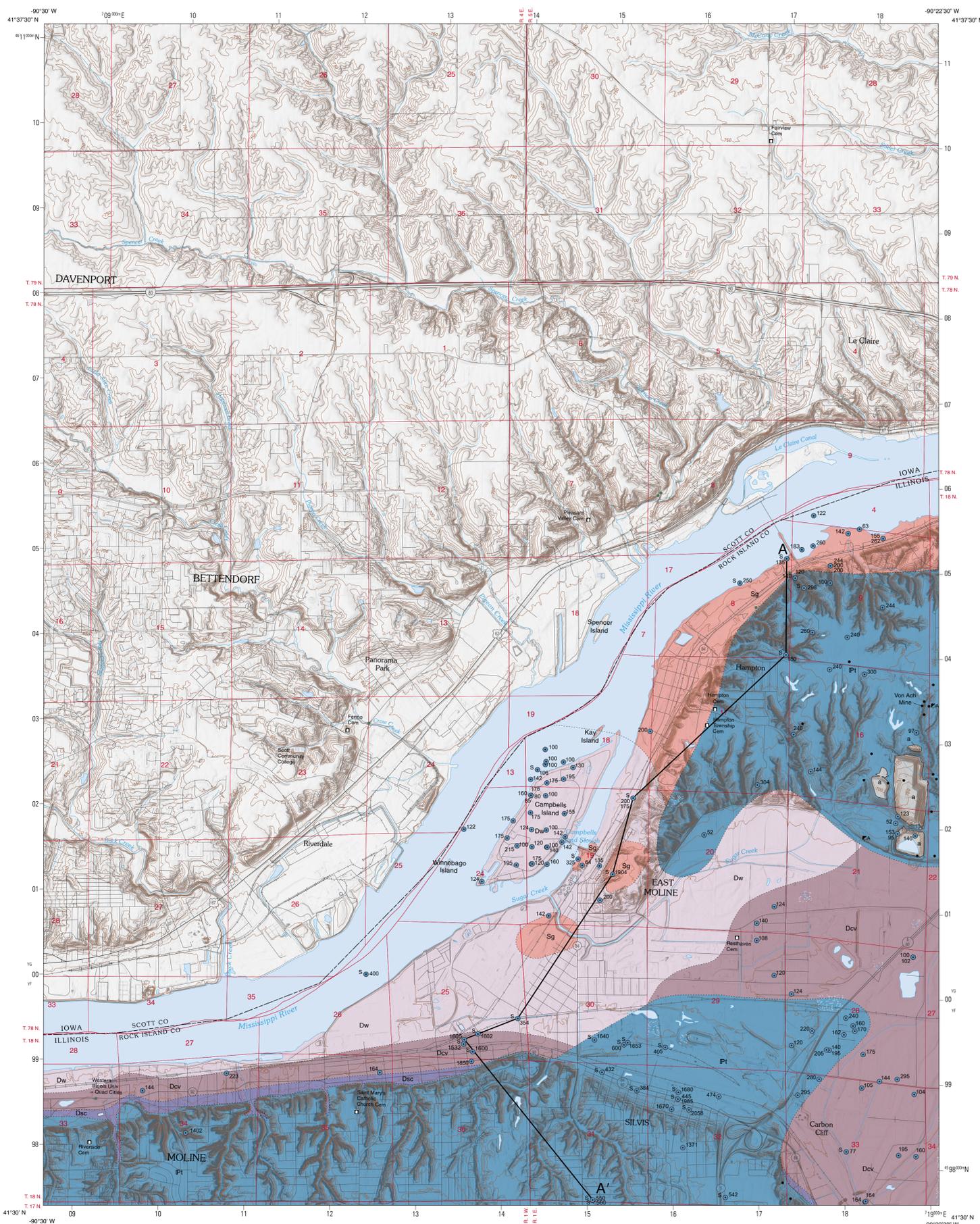
# BEDROCK GEOLOGY OF SILVIS QUADRANGLE

## ROCK ISLAND COUNTY, ILLINOIS

Prairie Research Institute  
ILLINOIS STATE GEOLOGICAL SURVEY

Franck R.A. Delpomdor  
2021

STATEMAP Silvis-BG



System	EXPLANATION	Series
Pennsylvanian	Unconformity	Desmoinesian-Atokan
	Pt	
Devonian	Unconformity	Upper Devonian
	Dsc	
	Unconformity	Middle Devonian
	Dcv	
Unconformity	Dw	Wapsipicon Limestone
Silurian	Unconformity	Niagaran
Sg	Gower Formation	

**Drill Holes**  
from which subsurface data were obtained

- Water well to bedrock
- Labels indicate core (c) and samples (s).  
Numeric label indicates total depth of boring in feet.

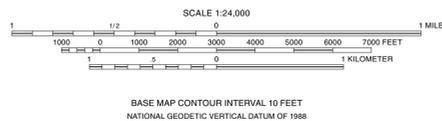
**Symbols**

- Coal mine slope, abandoned
- Coal mine, uncertain location
- Field station
- Contact concealed
- Line of cross section

Base map compiled by Illinois State Geological Survey from digital data (2018 US Topo) provided by the United States Geological Survey. Shaded relief and contours derived from LIDAR data from the Rock Island (2009) and Mississippi River North (2011) collections available through ILHMP and data provided by the Iowa LIDAR Consortium (2010).

North American Datum of 1983 (NAD 83)  
Projection: Transverse Mercator  
1,000-meter ticks: Universal Transverse Mercator grid system, zone 15

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Digital cartography by E. Bunsie and J. Carrell, 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.

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ADJOINING QUADRANGLES	
1	2
3	4
5	6
7	8

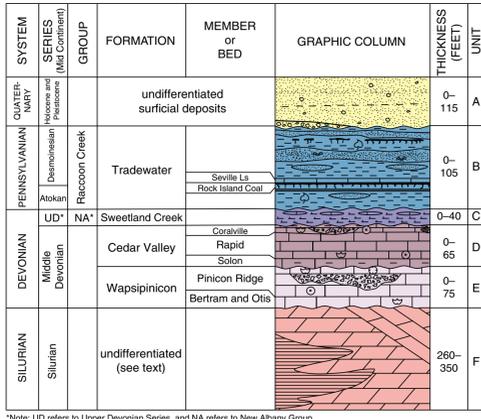
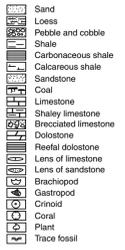
1 Eldridge  
2 McCausland  
3 Cordova  
4 Davenport East  
5 Port Byron  
6 Milan  
7 Coal Valley  
8 Green Rock



APPROXIMATE MEAN DECLINATION, 2021

**ROAD CLASSIFICATION**





\*Note: UD refers to Upper Devonian Series, and NA refers to New Albany Group

**A Cahokia Formation, Peoria Silt, Equality and Glasford Formations** Clay, silt, sand, gravel, loess and diamiction. Clay is gray with sand and silt layers. Silt is brown gray to yellow. Sand is light gray to yellow gray, locally argillaceous, fine- to coarse-grained, poorly sorted. Grains are subrounded to rounded tabular sand quartz. Gravels are angular to subrounded, and are composed of chert, quartz, igneous and metamorphic rocks and local underlying sedimentary rocks. Loess is yellow brown to gray, slightly calcareous, silty to sandy in the lower part. Diamiction is sandy and silty, tan to gray-brown, and discontinuously interstratified with sand and gravel. The contact with the underlying units is unconformable.

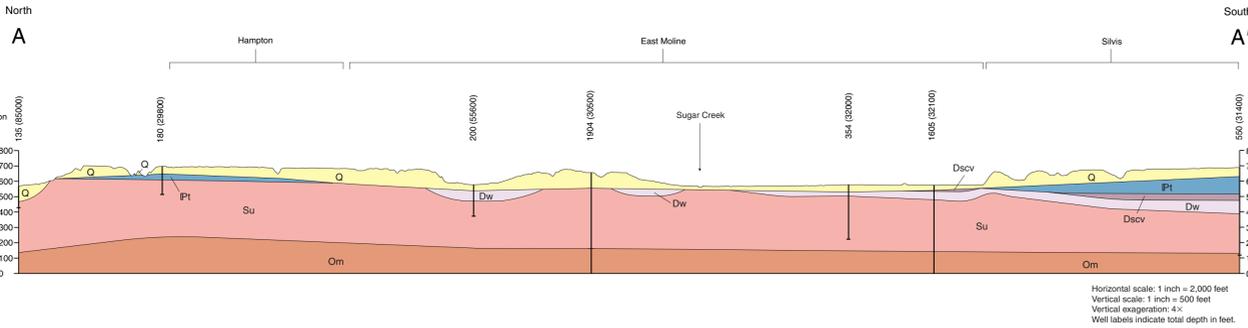
**B Tradewater Formation** Shale, siltstone, sandstone, coal and limestone. Shale is dark gray to gray, fissile to non fissile, carbonaceous near Rock Island (No. 1) Coal bed. A few beds of slightly undulated, medium to dark gray siltstone and tan, medium- to coarse-grained, poorly sorted, argillaceous and micaceous, subfossiliferous and quartz arenite occur in the shale. The Rock Island (No. 1) Coal bed is discontinuous and lenticular, and ranges between a few inches and 4 feet. Coal is dark, red to orange iron staining when weathered, and fissile. Above the Rock Island (No. 1) Coal bed, the Seville Limestone Member consists of a dense, dark gray, argillaceous, unfossiliferous, limestone. Locally, bluish-gray to white chert, named "Moline Chert" by archeologists, is associated with this limestone. Its maximum thickness is estimated around 6 feet, but in some water well records, the Seville Limestone Member is missing. Above this member, a medium gray shale that is overlain by a ferruginous, tan, medium- to coarse-grained, poorly sorted, argillaceous and micaceous, subfossiliferous and quartz arenite are common. Tree-like lycopsids (mosses), pteridosperms and ferns are common.

**C Sweetland Creek Shale** Shale. The shale is greenish gray to dark gray, fissile, slightly calcareous, silty shale with thin lenses of light gray to dark gray, massive to finely laminated, slightly calcareous, siltstone. Fossils are scarce, but brachiopod *Lingula* is common. Its maximum thickness is between 0 and 40 feet, but the formation is discontinuous in some areas of the quadrangle, in which it is missing. Its contact with the Middle Pennsylvanian strata is unconformable.

**D Cedar Valley Limestone** Limestone. The formation contains, from the oldest to the youngest, the Solon, Rapid and Coralville Members. The Solon and Rapid Members are only exposed in wells in the quadrangle, but the Coralville Member crops south of the campus of the Western Illinois University in NW¼ sec 33, T18N, R1W (N41.51130° W090.49267°). The Solon Member consists of grayish brown, fine- to coarse-grained, sandy, argillaceous to dolomitic, fossiliferous, limestone. The overlying Rapid Member is composed of gray to buff, fine-grained, argillaceous, locally dolomitic, limestone. The Coralville Member consists of light gray, brown to buff when weathered, fine- to medium-grained, very fossiliferous limestone with very thin greenish gray shale partings. Fossils include brachiopods (*Arypa*, *Strophodontia*, *Spiratrypa*, *Orthospirifer*, *Protolophostrophia*, *Elita*), colonial rugose and tabulate corals (*Heliophyllum* and *Cladopora*), disarticulated crinoids, stromatopod sponges and trilobites. This formation is conformably overlain by the Sweetland Creek Shale, or when this formation is missing, by the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation. Its maximum thickness is estimated between 0 and 65 feet.

**E Wapsipicon Limestone** Limestone. The formation contains, from the oldest to the youngest, the Otis and Pinicon Ridge Members. The Otis Member consists of light gray to greenish gray, fine- to coarse-grained to crystalline, slightly argillaceous to pure, peloidal, poorly fossiliferous, limestone. The Pinicon Ridge Member is largely composed of pinkish gray to light gray, argillaceous to pure, partly silty-sandy, unfossiliferous, dolomite and collapse breccias. The contact with the Cedar Valley Limestone is conformable with the Cedar Valley Limestone. The maximum thickness of this formation ranges between 0 and 75 feet.

**F Gower, Scotch Grove, Hopkington and Blanding Formations** Dolomite. The Silurian System subgroups in cutting rocks from wells bored for groundwater resources. Six of these cuttings, all located southeast, east and northeast of the Coe Upland, show a direct contact with the overlying Tradewater Formation or Quaternary deposits. The system comprises, from the oldest to the youngest, the Blanding, Hopkington, Scotch Grove and Gower Formations. The Blanding and Hopkington Formations are grouped together because well records are widely scattered. These formations consist of light gray, fine- to coarse-grained, dense to porous, locally pyritous, dolomite, which chert occurs in the Blanding Formation. The Scotch Grove Formation is composed of light gray to pinkish gray, fine- to coarse-grained, pure dolomite with thin pale greenish shale partings. The Gower Formation largely consists of light gray to yellowish-gray, slightly argillaceous to pure, coarse-grained to crystalline, vugular porous to dense, dolomite. Its maximum thickness ranges between 250 and 360 feet.



**Geographic location and geomorphological framework**  
The Silvis 7.5-minute Quadrangle is situated in the Quad Cities area, Rock Island County, in northwestern Illinois. The Silvis area is about 73 miles southeast of Cedar Rapids (Linn County, Iowa), 147 miles south-southwest of Chicago (Cook County), 75 miles northeast of Illinois-Iowa-Missouri border, and 70 miles northwest of Peoria (Peoria County). Map coverage extends to the east from the Davenport East Quadrangle, to the west from Port Byron Quadrangle, to the north from Coal Valley Quadrangle and south of the McCaustland Quadrangle in Iowa. The quadrangle covers approximately 20 square mile area that is bounded by 41°30'00" and 41°37'30" North latitude and 90°22'30" and 90°30'00" West longitude. The Silvis Quadrangle is mostly residential, in which the economic development is centered in the cities of Moline, Silvis, and East Moline. As of the 2019 U.S. Decennial census, the population covered by the quadrangle was estimated around 35,000.

The topography of the Silvis area is composed of two distinct upland areas, the Coe Upland, bounded by the Mecedosa Channel on the northeast (not represented in the map), Mississippi River on the west, Pleasant Valley and the Moline Upland on the south that are bounded by Mississippi River on the north and west (Figure 1). The upland plateaus are formed by gently rolling glacial moraine deposits, mainly composed of the Peoria Loess and silt of the Roxana Silts of the Equality Formation. The dissected valley sides around the Coe and Moline Uplands contain till and clay of the Kellerville Till Member of the Glasford Formation. Alluvial Cahokia deposits, that are composed of silt, sand and gravel, fill the floodplains and terraces of Mississippi River and Pleasant Valley. Surficial sediments are not mapped in this study. Bedrock surface is largely concealed beneath these sediments that range in thickness from 0 to 115 feet following the degree of the differential erosion. Bedrock exposures occur north and east of the Moline Upland near the city of Moline and the valley of Carbon Cliff respectively, and south and northwest of the Coe Upland, near the city of East Moline and north of the village of Hampton.

**Introduction**

**Silurian System**  
The Silurian System subgroups in 15 cutting rocks from wells bored for groundwater resources. Six of these cuttings, all located southeast, east and northeast of the Coe Upland show a direct contact with the overlying Tradewater Formation or Quaternary deposits. In the Silvis Heights's (API121610031400; total depth: 550 feet; 60 foot south line, 2,050 feet east line of sec 31, T18N, R1E) and City of Silvis's water wells, four distinct formations of the Silurian System are identified, and they consist, from the oldest to the youngest, of the undifferentiated Blanding and Hopkington, Scotch Grove and Gower. Due to the lack of water well records, all these formations are grouped together. The range in age of this system is Lower to Lower-Upper (?) Silurian. Its maximum thickness is estimated between 260 and 350 feet. The name of the Blanding Formation is taken for the upper part of Mississippi River bluffs near Hopkington, Jo Daviess County (William, 1973), while the Hopkington Formation was defined for Hopkington, Iowa (Wilson 1895). The formations consist, from the oldest to the youngest, of much, light gray, very coarse-grained, sandy dolomite, 30 feet light gray to tan, fine- to coarse-grained, dense to porous, dolomite, and 25 feet light gray, fine- to coarse-grained, dense to porous, locally pyritous, dolomite. The Scotch Grove Formation derives its name for Scotch Grove Township, Iowa. Cutting rocks from Silvis's wells consist of light gray to pinkish gray, fine- to coarse-grained, pure dolomite with thin pale greenish shale partings. Its maximum thickness ranges between 80 and 100 feet. The Gower Formation takes its name for Gower Township, Iowa, where exposures in the Anamosa Quarry show laminated dolomite (Norton 1899). The formation includes Anamosa and Le Claire Members, where they are exposed in the Mill Creek and Allied Quarries in the Milan and Davenport East Quadrangles (Devera and Kriener 2020). In the Silvis area, these members are composed, from the oldest to the youngest, by a light gray to yellowish-gray, slightly argillaceous to pure, dolomite, and light gray, largely coarse-grained to crystalline, vugular porous to dense, dolomite. The maximum thickness of the Gower Formation varies between 75 and 110 feet.

**Devonian System**  
The Devonian System comprises, from the oldest to the youngest, the Wapsipicon Limestone, Cedar Valley Limestone, and Sweetland Creek Shale. The range in age of this system is Lower Middle to Upper Devonian Series in North America (Eifelian to Famennian Stages of the Middle and Upper Devonian). The Devonian strata unconformably overlie the strata of Silurian age. This unconformity represents the boundary between the Tippecanoe and Kaskaskia sequences. In the Silvis area, the Upper Middle Devonian Cedar Valley and Upper Devonian Sweetland Creek Shale strata are locally removed by erosion prior to Pennsylvanian time, in which the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation strata rest directly upon the Lower Middle Devonian Wapsipicon Limestone. Such contact is observed in the John Deere Co's water well (API121612358500; total depth: 600 feet; 90 feet south line, 142 feet east line of NW SE SE sec 33, T18N, R1E) south of the Moline Upland. In the Hampton, East Moline and Pleasant Valley, the Devonian System directly subgroups the Quaternary sediments. The Devonian System is rarely exposed in the Silvis area, but the Upper Middle Devonian Coralville Member of the Cedar Valley Limestone is well exposed south of the campus of the Western Illinois University in NW¼ sec 33, T18N, R1W (N41.51130° W090.49267°) (Plate 1). The maximum thickness of the Devonian System ranges between 0 and 180 feet.

**Wapsipicon Limestone (Lower Middle Devonian Series).** The name of the Wapsipicon Limestone is taken for exposures along Wapsipicon River, Iowa (Norton 1895). In the Silvis area, the formation comprises the Otis (oldest) and Pinicon Ridge (youngest) Members. The Wapsipicon Limestone only subgroups in the quadrangle, in which the contact with the Tradewater Formation is missing. It consists of light gray to greenish gray, fine- to coarse-grained to crystalline, slightly argillaceous to pure, peloidal, limestone (Otis Member), and pinkish gray to light gray, argillaceous to pure, partly silty-sandy, dolomite and collapse breccias (Pinicon Ridge Member). The formation is mostly unfossiliferous, but scattered fossils of the brachiopod *Emanella subinotata*, stromatolites and disarticulated fish remains have been identified in the Tradewater Formation (Norton 1998). The contact with the Cedar Valley Limestone is conformable with the Cedar Valley Limestone. Its maximum thickness ranges between 0 and 75 feet, where the East Moline City and Conover's (API121610013300; total depth: 100 feet; 5/8 SW¼ sec 18, T18N, R1E; located north-northwest Campbell's Island) are thicker (respectively 75 and 70 feet thick).

**Cedar Valley Limestone (Upper Middle Devonian Series).** The Cedar Valley Limestone derives its name for the valley of Cedar River, Iowa (McGee 1891). In the Silvis area, three members are identified from cutting rocks of twelve water wells, in which the formation directly subgroups the Quaternary sediments north and northeast of Moline Upland and in large part of Pleasant Valley. In these areas, the Cedar Valley Limestone consists of the Solon (oldest), Rapid and Pinicon (youngest) Members. The Solon and Rapid Members only subcrop in wells, while the Coralville Member crops south of the campus of the Western Illinois University in NW¼ sec 33, T18N, R1W (N41.51130° W090.49267°) (Plate 1). The Solon Member consists of grayish brown, fine- to coarse-grained, sandy, argillaceous to dolomitic, limestone. Brachiopods, where *Arypa independentis* is the most common fossil, are abundant, but fossils such as disarticulated crinoids, trilobites and bryozoans are common. The overlying Rapid Member is largely composed of gray to buff, fine-grained, argillaceous, locally dolomitic, limestone. This member contains brachiopod *Orthospirifer inowensis* and disarticulated crinoids (Devera and Kriener 2020). Its maximum thickness was estimated around 60 feet in the Rock Island area (Collinson and Atherton 1975). The Coralville Member consists, from the oldest to the youngest, of light gray to gray-brown, fine- to medium-grained, limestone (Plate 1B) with very thin greenish gray shale partings, becoming shaly in its upper part. South of the campus of the Western Illinois University, collapse breccia formed of angular to subangular fragments of Coralville Member within a whitish to pale gray calcareous sandy matrix fills an irregular surface (Plate 1A and D). In this area, this member is very fossiliferous, and contains abundant fossils that include brachiopods (*Arypa*, *Strophodontia*, *Spiratrypa*, *Orthospirifer*, *Protolophostrophia*, *Elita*), colonial rugose and tabulate corals (*Heliophyllum* and *Cladopora*), disarticulated crinoids, stromatopod sponges and trilobites (Plate 1C). Its maximum thickness is estimated between 0 and 65 feet. This formation is unconformably overlain by the Sweetland Creek Shale, or when this formation is missing, by the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation.

**New Albany Shale Group.** In the Silvis area, the Sweetland Creek Shale is the only formation that occurs in the Upper Devonian New Albany shale Group. This group is 0-40 feet thick in the area.

**Sweetland Creek Shale (Upper Devonian Series).** The Sweetland Creek Shale is taken its name for Sweetland Creek, Iowa, where the type section of 144 feet thick gray and green shale that underlies the black shales of Grassy Creek Shale (Udden 1899). In the Silvis area, the Sweetland Creek Shale only subcrops in a few water wells. Locally it directly subgroups the Quaternary sediments north and east of the Moline Upland. The formation is locally eroded, where the underlying Cedar Valley Limestone is directly overlain by the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation. The formation consists of greenish gray to dark gray, fissile, slightly calcareous, silty shale with thin lenses of light gray to dark gray, slightly calcareous, siltstone. The paleontology of this formation is scarce, but it mostly contains brachiopod *Lingula*. Its maximum thickness ranges between 0 and 40 feet. Its contact with the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation is unconformable.

**Pennsylvanian System**  
In the Silvis area, the Pennsylvanian System directly overlies Devonian strata or, when the Devonian System is eroded, the Silurian strata. Only the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation crops in the quadrangle. The range in age of this system is Atokan-Desmoinesian of the Middle Pennsylvanian in North America (Moscovian Stage of the Middle Pennsylvanian). Its maximum thickness is estimated around 0 and 105 feet.

**Raccoon Creek Group.** The name of Raccoon Creek Group is derived for Raccoon Creek, Indiana (Wier 1961). It is the basal group for Pennsylvanian strata in Illinois. In the Silvis area, it only comprises the Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater Formation. Muscatine Formation is missing in the area, in which the Tradewater Formation unconformably rests on the underlying Devonian or Silurian strata. The Raccoon Creek Group occurs in the Moline and Coe Uplands, where the Devonian and Silurian Systems do not subcrop. The group is unconformably overlies by Quaternary sediments.

**Tradewater Formation.** Both the Abbott and Spoon Formations have been formally changed in Illinois to the Tradewater Formation (Jacobson 1992). In the Rock Island area, the Rock Island (No. 1) Coal bed is the basal member of the Tradewater Formation. The formation locally crops in steep valley sides and bluffs along the Moline and Coe Uplands. The best exposures are located near the village of Carbon Cliff, where shales of the Tradewater Formation crop. A few bedrock exposures outcrop south and northwest of the Coe Upland. Its lithology is largely described from cutting rocks of water well data. The Tradewater Formation is dominated by silticities that mainly include gray to dark gray, fissile to non-fissile, shale, medium to dark gray siltstone and light gray to yellow, medium- to coarse-grained, generally well sorted, subfossiliferous and quartz arenite. The Rock Island (No. 1) Coal bed is discontinuous that laterally pinches out with shale. Its maximum thickness varies between a few inches and 4 feet. A few coal seams (1/5 to 1 1/2 inches

thick) are common in the area. Coal is dark, red to orange iron staining when weathered, and fissile. The Seville Limestone Member crops just above the Rock Island (No. 1) Coal bed and only subcrops in the Silvis Quadrangle. It is a dense, dark gray, argillaceous, unfossiliferous, limestone. A few shales of bluish-gray to white chert that has been named "Moline Chert" by archeologists are found in cutting rocks from water wells. Its maximum thickness is estimated around 6 feet, but in some water well records, the Seville Limestone Member is missing. Above this member, a medium gray shale that is overlain by a ferruginous, tan, medium- to coarse-grained, poorly sorted, argillaceous and micaceous, subfossiliferous and quartz arenite are common. Tree-like lycopsids (mosses) (*Lepidodendron*, *Sigillaria*) and fusulinid *Fusulinella inowensis* have been identified in the Tradewater Formation near the village of Carbon Cliff and Shaffer Creek in the Coal Valley Quadrangle (Culver 1922, 1923; Thompson 1934). An assemblage of 14 fossil-taxa is overwhelmingly dominated by pteridosperms, including *Laciniopteris rarineris*, *Neuropteris flexuosa*, *Alethopteris vertii*, *Macroneuropteris schucheri*, and *Mariopteris nervosa*, whereas bryopsids, sphenopsids, and ferns have been described in the Rock Island (No.1) Coal bed from the Quad Cities area (Bashford and Nelson 2015). Trace fossils including *Tetichichnia* (vertical stack of horizontally-oriented burrow with spreiten attributed to an annelid worm), *Asterosoma* (radiating bulb-like swelling burrow) and *Conoscoelus* (long-ranging and plug-shaped form attributed to a solitary polypoid endiarion) are found in siltstone beds of the Tradewater Formation in the Davenport East and Milan Quadrangles and Coal Valley Quadrangle respectively southwest and south of the quadrangle (Devera and Kriener 2020; Delponador 2021). The maximum thickness of the Tradewater Formation ranges between 0 and 105 feet.

**Quaternary System**  
Pleistocene and Holocene (Quaternary) sediments mantle bedrock throughout the Silvis Quadrangle. Four distinct formations are identified and consist, from the oldest to the youngest, of the Glasford Formation that includes tan to gray-brown compact silty silt with gravel, sand and silt interlays of the Kellerville Till Member, the Roxana Silts of the Equality Formation that includes yellow brown to tan gray, calcareous, silty to sandy in the lower part, the Peoria Loess, and the Cahokia Alluvium that includes sandy gravel, sand, silt or clay. The Illinoisian Glacial Episode comprises the Glasford Formation, while the Wisconsinian Glacial Episode comprises the Roxana Silts. The thickness of Quaternary sediments ranges from 0 to 115 feet, being greatest on the southwest. The Quaternary System is omitted from the map.

**Structural Geology**

The Silvis Quadrangle is situated on eastern margin of the Mississippi River Arch separates, respectively from the east to the west, the Illinois and East Central Iowa basins. The area is bounded to the west by the Sangamon Arch, and to the north the Wisconsin Arch. The bedrock is a nearly flat-lying bedding, where the dip of Paleozoic strata locally ranges a few degrees toward the south and southwest. The highest dip is caused by the irregular surface or paleokast that occur between the Atokan-Desmoinesian Tradewater Formation over the Devonian or, when the Devonian is eroded, Silurian strata. A paleokast is identified south of the campus of the Western Illinois University in NW¼ sec 33, T18N, R1W (N41.51130° W090.49267°), in which an unappreciated breccia fills an irregular surface within the Upper Middle Devonian Coralville Member of the Cedar Valley Limestone (Plate 1).

**Economic Resources**

**Waste disposal**  
In the Silvis area, all upland areas underlain by Pennsylvanian bedrock satisfy the requirements for solid-waste disposal. These areas have favorable hydrogeologic conditions, in which glacial till is relatively thick and the shale of the Tradewater Formation has low permeability. In the other areas (e.g., floodplains and terraces of Mississippi River and Pleasant Valley), the risk of contamination of the Silurian dolomite aquifer is high. In the Silvis area, the site of the Upper Rock Island County Landfill sec 16 and 21, T18N, R1E is located 17201 20th Ave. North East Moline south of the Coe Upland, in which hydrogeologic conditions are favorable. The geology is well documented by abundant water and engineering wells and mine records. Much as 30-40 feet thick of Quaternary silty clay and 40-57 feet thick of Middle Pennsylvanian (Atokan-Desmoinesian) Tradewater shale, overlying Upper Middle Devonian Cedar Valley limestone are largely the dominant materials in the site. Over 12 million cubic yard of solid-waste disposal cover the site in 11 Illinois Environmental Protection Agency 2020).

**Groundwater**  
The Mississippi River serves as the water source for the cities of Moline and East Moline and the village of Hampton, while the village of Coal Valley is supplied by wells pumping from limestone crevices at depths of 100 to 300 feet. Most of this water from water wells is obtained from cracks and crevices in the Silurian System. The 1,000 feet-deep aquifers within the Middle-Upper Ordovician Glenwood-St. Peter and Galena-Platteville Formations are the main supplied water from 4 wells withdrawing 130 to 150 gallons per minute for the village of Carbon Cliff (Carbon Cliff's Annual drinking water quality report 2019). Waters from these aquifers have generally low concentration of dissolved solids. In the floodplain of Mississippi River, Quaternary aquifers yield much 1,000 gallons per minute, but they are generally unfavorable for potable supply due to high concentration of total dissolved solids (Devera and Kriener 2020). The largest cities such as Moline and East Moline takes water from Mississippi River and treats up to 5 billion gallons per year at our Water Filtration Plant (Moline and East Moline's Annual drinking water quality reports 2019).

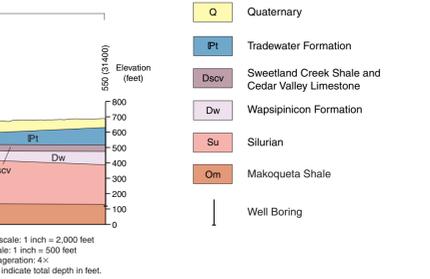
**Coal**  
Coal has been actively mined in numerous small underground mines in the Rock Island (No. 1) Coal bed that was operated around the "Happy Hollow" valley, a dissected valley south of the Coe Upland (sec 15 and 16, T18N, R1E). Mining began in the 1870s, and because of the lenticular nature of the Rock Island (No. 1) Coal bed, few of the mines were very large or operated for very long, most closing before 1900. The thickest coal bed between 3.0 and 4.0 feet has been mined. The most productive coal mine, the Cook mine (Mine index 5552 in Obrad and Chenoweth, 2008; sec 16, T18N, R1E) has been produced 18,451 tons between 1913 and 1918. Other productive coal mines have produced less than 10,000 tons, in which the Iron Arch (Mine index 5311; sec 16, T18N, R1E) and Guichert Bothers (mine index 5311; not reported in this study because the location is unknown) mines have mined a total of 19,810 tons (respectively 8,653 and 11,157 tons) between 1892 and 1909. The latest active coal mine has closed in the 1920s, in which the high cost of mining made the area un-economic. The total production of coal has been estimated over 200,000 tons. All mines are now abandoned.

**Acknowledgments**

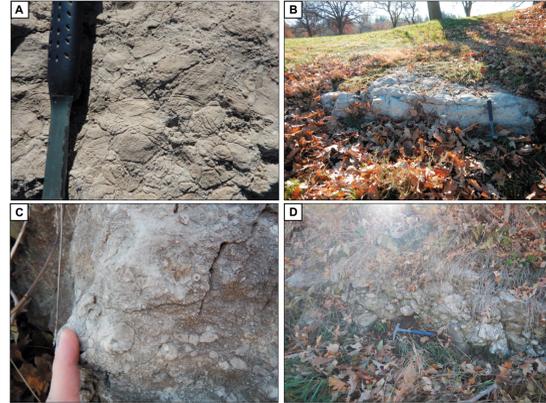
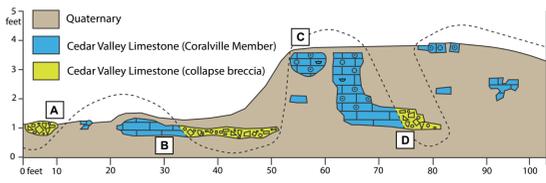
The authors acknowledge with all landowners for permission to access outcrops in Silvis area. We would like to thank Paul Wynmore, operations manager of the Upper Rock Island County Landfill for the documentation of the site. Special thanks go to Emily Burns for preparation of the LIDAR base map and the cartography of the map. The new illustrations for this report were crafted by Frank Delponador. This research was supported in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program (STATEMAP) under USGS award number G20AC00371. 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.

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**Plate 1** Outcrop photograph showing collapse breccia filling the Upper Middle Devonian Coralville Member, Cedar Valley Limestone. Location: south campus of the Western Illinois University in NW¼ sec 33, T18N, R1W (N41.51130° W090.49267°). (A) Collapse breccia composed of subangular to angular, rarely subrounded, fragments of Coralville Member in a pale gray calcareous sandy matrix. (B) Whitish to light gray, dense, fine-grained to crystalline, limestone. (C) Light gray, very fossiliferous, limestone including rugose and tabulate corals, disarticulated crinoids and brachiopods. (D) Contact between limestone and collapse breccia.