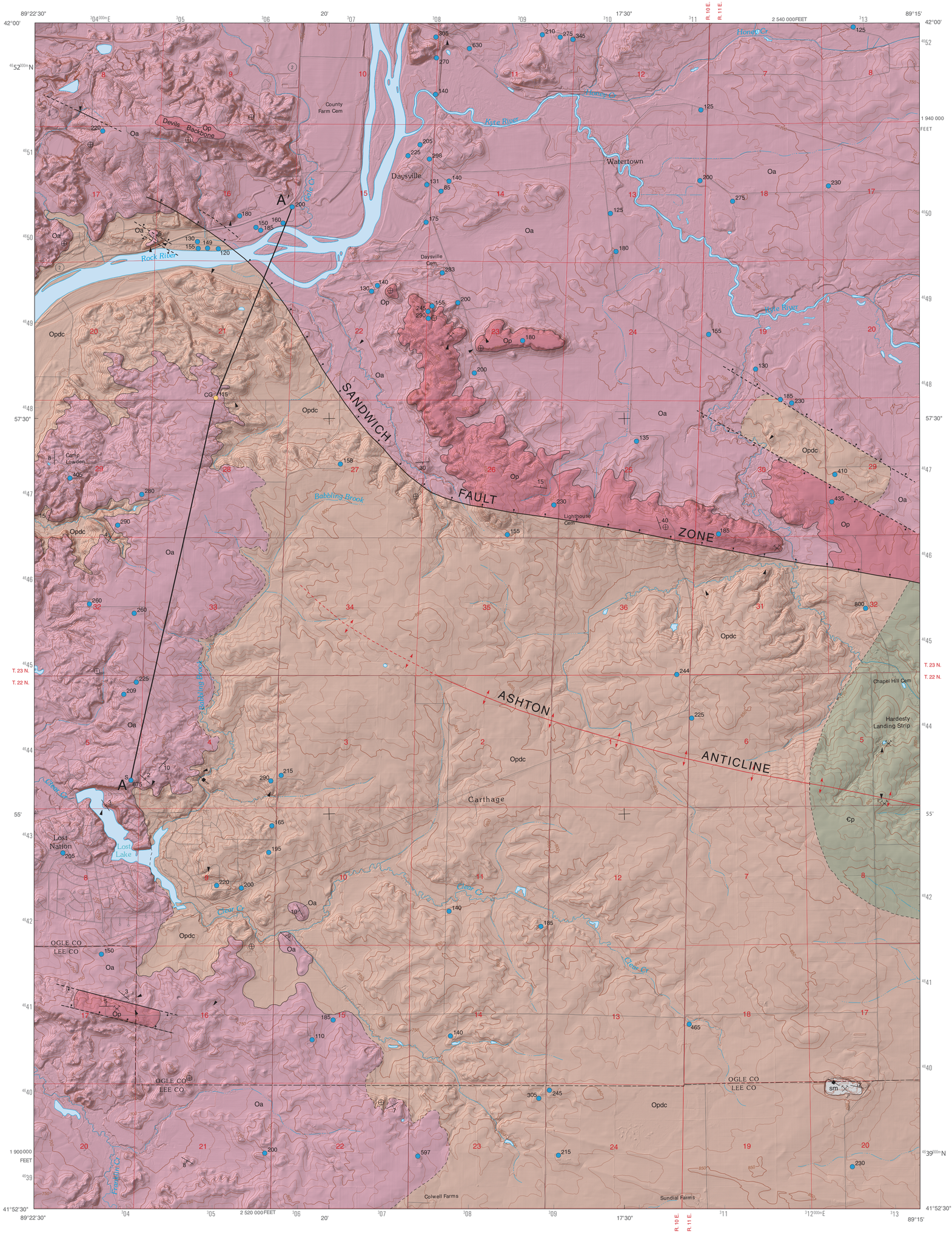
BEDROCK GEOLOGY OF DAYSVILLE QUADRANGLE
OGLE AND LEE COUNTIES, ILLINOIS

Prairie Research Institute
ILLINOIS STATE GEOLOGICAL SURVEY

STATEMAP Daysville-BG

Dennis R. Kolata
2014



EXPLANATION

- sm — Quarry mine
- Ordovician
  - Mohawkian
    - Op — Platteville Formation
    - Oa — Ancell Group
  - Ibexian
    - Opdc — Prairie du Chien Group
  - Cambrian
    - St. Croixan
      - Cp — Potosi Formation

Symbols

- 40 — Strike and dip of bedding; number indicates degree of dip
- Vertical joint
- Horizontal bedding
- Active quarry
- Abandoned quarry
- Outcrop of special note; shown where contact, map unit, or fault was well exposed at time of mapping

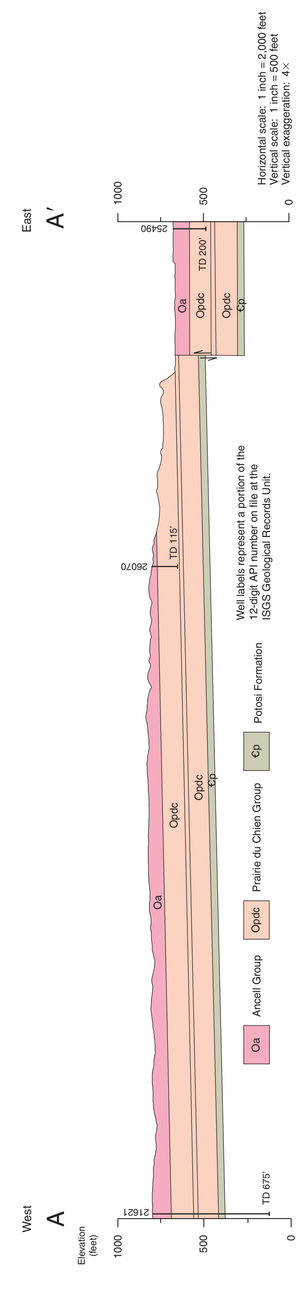
Drill Holes
from which subsurface data were obtained

- Stratigraphic boring
- Water well
- CG ○ 125 — Labels indicate core (c) and geophysical log (g) Numeric label indicates total depth of boring in feet. Unit label denotes formation at bottom.

Line Symbols
dashed where inferred

- Contact
- Normal fault; bar and ball on downthrown side
- Anticline
- 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 (2012 US Topo) provided by the United States Geological Survey. Shaded relief and contours derived from 2009 LiDAR elevation data.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Illinois Coordinate System of 1983, west zone
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

Recommended citation:
Kolata, D.R., 2014, Bedrock Geology of Daysville Quadrangle, Ogle and Lee Counties, Illinois: Illinois State Geological Survey, USGS-STATEMAP contract report, 2 sheets, 1:24,000.

SCALE 1:24,000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology based on field work by Dennis R. Kolata, 2014.

Digital cartography by Jennifer E. Carrell, John D. Zearing and Brittany M. Walbright, Illinois State Geological Survey.

This research was supported in part by the U.S. Geological Survey (USGS) National Cooperative Geologic Mapping Program (STATEMAP) under USGS award number G13AC00240. 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 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.

The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this document and accept no liability for the consequences of decisions made by others on the basis of the information presented here. The geologic interpretations are based on data that may vary with respect to the accuracy of geographic location, the type and quantity of data available at each location, and the scientific and technical qualifications of the data sources. Maps or cross sections in this document are not meant to be enlarged.

ILLINOIS STATE GEOLOGICAL SURVEY
PRAIRIE RESEARCH INSTITUTE

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

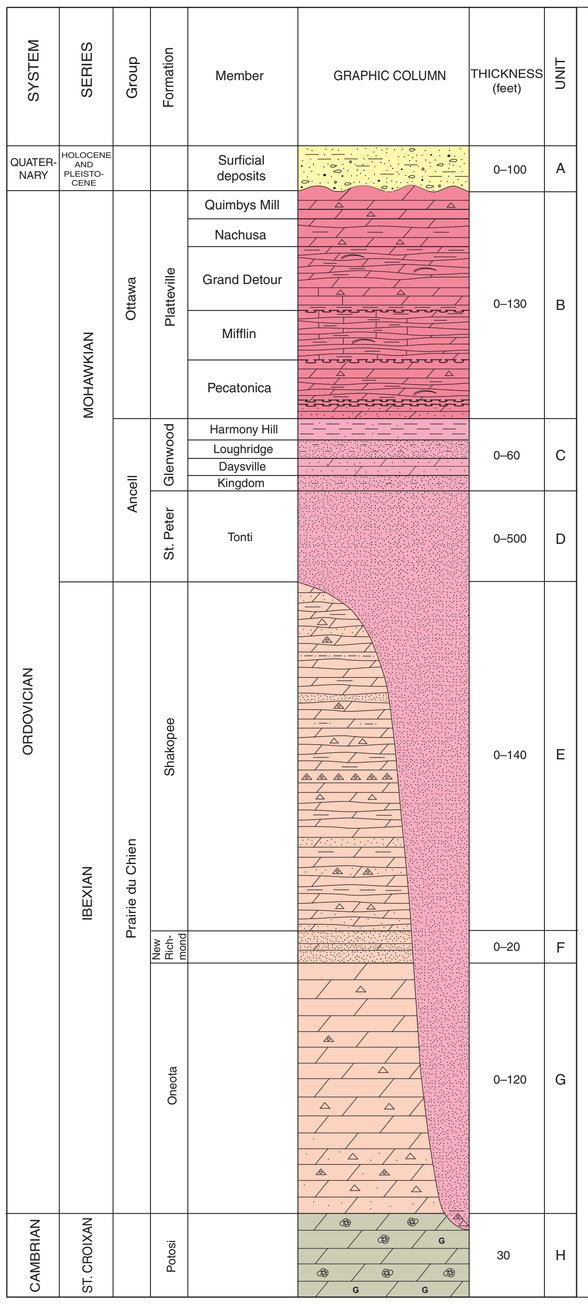
Prairie Research Institute
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820-6918
(217) 244-2414
http://www.isgs.illinois.edu

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Mount Morris
2 Oregon
3 Stillman Valley
4 Grand Detour
5 Chana
6 Dixon East
7 Franklin Grove
8 Ashton

2½° TRUE NORTH MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2014

ROAD CLASSIFICATION
Interstate Route
U.S. Route
State Route
Local road



A Quaternary Surficial Deposits Clay, silt, sand, gravel and boulders deposited primarily as alluvium along river and stream valleys, rock debris below cliffs, glacial till and windblown silt on the uplands, and local lacustrine deposits. Not shown on map.

B Platteville Formation Dolomite, largely bluish gray to buff, very fine to fine-grained, partly cherty, argillaceous, and fossiliferous. The Platteville Formation consists of five dolomite members differentiated largely by shale content and relative amount of disseminated clay. These include the Quimbys Mill, Nachusa, Grand Detour, Mifflin and Pecatonica Members. The Platteville is exposed in an abandoned quarry on the east side of Lowell Road one mile south of Daysville (SE NW NE Sec. 22, T23N, R10E) and intermittently along the same bluff extending southeastward to the center of Sec. 26, T23N, R10E, and then eastward through the northern part of Sec. 32, T23N, R11E, where the Platteville is dropped down in juxtaposition with the Prairie du Chien Group. The Platteville also occurs at the bedrock surface along the crest of Devils Backbone (Sections 9 and 16 T23N, R10E) and in a small northwest-trending graben in Sections 16 and 17, T22N, R10E. Most of the Platteville Formation that is exposed in the Daysville quadrangle appears to consist of the Mifflin and Pecatonica Members, however, for the sake of completeness all of the members are described below.

Quimbys Mill Member Dolomite, very light gray in fresh exposures; argillaceous to relatively pure, dense, fine to very fine grained; 2 to 8 inch thick, even, well defined beds with smooth wavy bedding planes separated by light greenish gray shale partings mainly less than 1/8 inch thick; locally contains white chert nodules. Relict bioclastic textures in the chert indicate that the initial carbonate deposit was lime mudstone. Lenticular cavities ½ to 1 inch across, up to 1/8 inch wide and vertically oriented characterize the upper part of the formation. The fauna is sparse and low in diversity. The top of the formation is marked by a prominent hardground omission surface that is pocked with irregular solution cavities up to 2 inches across and 1 to 6 inches deep that are encrusted with iron-rich minerals. The base is gradational with the underlying Nachusa Formation.

Nachusa Member Dolomite, light gray in fresh exposures, weathers to light buff or yellowish gray; pure to slightly argillaceous, vesicular, vuggy in weathered outcrops, fine to medium grained, 4 to 8 inch thick beds; contains white to medium gray chert nodules. Relict bioclastic textures in the chert indicate that the initial carbonate deposit was lime mudstone. The shelly fossils are sparse and low in diversity, however, there is a conspicuous abundance of trace fossils assignable to the genus Chondrites that occur on bedding surfaces throughout the formation. The base of the formation is commonly marked by an abrupt change from relatively pure dolomite to the underlying clay and silt-rich dolomite of the Grand Detour Member.

Grand Detour Member Dolomite, light gray in fresh exposures, weathers to light buff or yellowish gray; pure to argillaceous, fine grained; contains white to medium gray chert nodules. Upper part of the formation is argillaceous and consists of wavy, nodular beds mostly between 3 and 6 inches thick that are separated by medium brownish gray, shale partings up to 1 inch thick. These beds are characterized by medium to dark gray spots approximately 1/8 inch in diameter. Lower part of formation is relatively pure with even beds that are mostly 4 to 10 inches thick and contain white to medium gray chert nodules. The Grand Detour contains a diverse and locally abundant fossil fauna including brachiopods *Opikina, Campylorthis, Hesperorthis, Rostricellula,* and *Strophomena;* gastropods *Lophospira, Clathrospira, Trochonema, Ectomaria, Phragmolites, Tetranota,* and *Maclurites;* cephalopods *Richardsondoceras* and *Endoceras;* trilobites *Thaleops, Ceraurus, Encrinurus,* and *Isotelus;* corals *Foerstephyllum* and *Streptelasma;* and crinoids *Cupulocrinus* and *Ablutoglyptocrinus.* The lower two feet of the formation contains a locally abundant lithistid fossil sponge fauna including *Anthaspidella* and *Zittelella.* The base is marked by a hardground surface.

Mifflin Member Dolomite, light gray in fresh exposures, weathers to light buff or yellowish gray; argillaceous, fine to very fine grained lime mudstone and wackestone; 1 to 4 inch thick wavy, nodular beds separated by beds of greenish-gray shale as much as an inch thick, but mostly less than ½ inch. The abundance of shaly partings and nodular bedding differentiate the Mifflin from the thicker bedded, relatively pure formations above and below. A thin K-bentonite bed has been observed locally at the top of the formation (Willman and Kolata 1978). The Mifflin is the most fossiliferous unit in the Platteville Formation. Bedding planes are typically covered with well-preserved disarticulated or whole invertebrate fossils including brachiopods, bryozoans, ostracodes, corals, trilobites, and echinoderms. An abundant and diverse fossil molluscan fauna is commonly present within beds. Some of the more common fossils include the brachiopods *Opikina, Campylorthis, Doleroides, Hesperorthis, Protozyga, Rostricellula,* and *Strophomena*; gastropods *Lophospira, Clathrospira, Trochonema, Ectomaria, Phragmolites, Tetranota, Subulites,* and *Maclurites*; cephalopods *Richardsondoceras, Whitfieldoceras,* and *Endoceras*; clam *Vanuxemia*; trilobites *Thaleops, Ceraurus, Encrinurus,* and *Isotelus;* corals *Foerstephyllum* and *Streptelasma;* and crinoids *Cupulocrinus, Cremacrinus* and *Ablutoglyptocrinus.* The base of the Mifflin is marked by a prominent ferruginous hardground surface.

Pecatonica Member Dolomite, light gray in fresh exposures, weathers to light buff or yellowish gray; pure to slightly argillaceous, fine grained, dense; 2 to 8 inch thick even, well defined beds with light greenish gray shale partings mainly less than 1/8 inch thick; a few beds near the middle of the unit are wavy and nodular; contains white to medium gray chert nodules. The lower half of the member contains St. Peter Sandstone-like quartz sand grains that are well rounded, frosted and increase in abundance downward. Phosphatic grains and nodules are locally present in the lower 5 feet. A deeply sculpted hardground omission surface is present at the top of the unit and two or three are present in the lower 8 feet. The Pecatonica is less fossiliferous than the overlying Mifflin Formation, but a few beds in the middle part of the unit contain brachiopods, bryozoans, ostracodes, corals, trilobites, and echinoderms. The base is marked by an abrupt change from dolomite to the underlying shale and sandstone of the Ancell Group.

C Glenwood Formation Shale, sandstone, siltstone, and dolomite. Four members can be recognized in the area of the Daysville quadrangle. In ascending order these are the 1) Kingdom Sandstone Member consisting of sandstone that is mainly greenish gray, silty, argillaceous, and pyritic; 2) Daysville Dolomite Member consisting mainly of dolomite that is argillaceous, silty, sandy, greenish gray, and chalky to dense; 3) Loughridge Sandstone Member composed mainly of sandstone that is silty, argillaceous, greenish gray or light brown, very fine to coarse grained; and 4) Harmony Hill Shale Member consisting of shale that is medium to dark greenish gray or dark maroon, pyritic, partly silty and sandy, friable, and thinly laminated. The upper part of the Harmony Hill Shale contains phosphatic pellets and small nodules. The Glenwood Formation generally forms a sharp contact with the overlying dolomite of the Platteville Formation. Scolecodonts have been reported from the Glenwood (Templeton and Willman 1963) but the unit is largely unfossiliferous. The base is marked by an abrupt change to clean, white sandstone. The Glenwood is combined with the underlying St. Peter Sandstone on the geologic map. The best exposures occur in the SW1/4 Sec. 8 T23N, R10E.

D St. Peter Sandstone Sandstone Characterized by pure quartz sand that is very light gray to white, very fine to coarse grained, well rounded, frosted, sorted, friable, thick bedded, and nonfossiliferous except for local trace fossils. The lower part of the St. Peter locally contains coarse rubble or conglomerate of chert in a matrix of clay and sand that formed as a residue from deep weathering of the underlying cherty dolomite of the Prairie du Chien Group. The base of the formation is marked by a major unconformity. On this map, the St. Peter Sandstone and overlying Glenwood Formation are assigned to the Ancell Group and mapped as one unit. The St. Peter is widely exposed in the bluffs of the Rock River and its tributaries in the western parts of the Daysville quadrangle.

E Shakopee Dolomite Dolomite, sandstone, chert, shale, and siltstone. Consists mainly of dolomite that is argillaceous to pure, fine to medium grained, with some thin beds of medium grained cross bedded sandstone, coarse grained dolomite, white to light gray oolitic chert, light greenish gray shale, and buff siltstone. Fossils are limited to gastropods and cephalopods but are rare. Algal domes as much as six feet in diameter are present locally but are not common. One such dome is exposed in a small bedrock exposure near the intersection of Clear Creek and Lowden Road (SW SE SE Sec. 9 T22N, R10E). The top of the Shakopee in the region is marked by a prominent and widespread unconformity (Sauk unconformity) that formed prior to deposition of the St. Peter Sandstone. It is suspected that in some parts of the quadrangle, particularly near the Sandwich Fault Zone, that the unconformity cuts down into the Upper Cambrian rocks (Willman and Templeton, 1951). This appears to be the case in a small roadcut on Highway 2 south of Oregon, Illinois (NE SE SE Sec. 17, T23N, R10E) where faulted rocks of the Potosi Formation and Prairie du Chien Group are truncated and covered by apparent non-faulted St. Peter Sandstone. The base of the Shakopee is gradational with the New Richmond Sandstone.

F New Richmond Sandstone Sandstone and dolomite. The sandstone is pure quartz sand that is very light gray to white, very fine to coarse grained, subrounded to round, frosted, sorted, friable, cross bedded and locally ripple marked. The dolomite interbeds are fine grained, sandy, and locally contain oolitic chert. The physical characteristics of the dolomite are very similar to those of the overlying Shakopee Dolomite. Isolated outcrops of the New Richmond are difficult to identify in the field because the sandstone is lithologically similar to the St. Peter Sandstone, Gunter Sandstone and beds of sandstone in the Shakopee Dolomite. The New Richmond rests conformably on the Oneota Dolomite.

G Oneota Dolomite Dolomite The dolomite is pure, medium- to coarse grained, and light brownish gray. The predominance of coarse grained dolomite characterizes the unit. The Oneota contains chert that is white to light gray and forms layers, lenses, nodules, and irregular branching bodies, some of which contain small gastropods and cephalopods. The base is marked by a sharp contact with the underlying Potosi Dolomite. The Gunter Sandstone and older Eminence Formation, which commonly underlie the Oneota in parts of northern Illinois, appear to be absent in the Daysville quadrangle (Willman and Buschbach, 1975). The Oneota is particularly well exposed in the Machlin Quarry in the southeastern part of the quadrangle (N½ NW Sec. 20, T22N, R11E).

H Potosi Dolomite Dolomite The dolomite is pure to slightly argillaceous, fine grained, light brown to pinkish gray and contains small amounts of glauconite particularly near the base. The dolomite is characterized in outcrop and subsurface samples by the presence of small cavities and vugs lined with drusy quartz. The Potosi is exposed in a small abandoned quarry 50 yards east of the intersection of Dugdale and Prairie Roads (SW SW SE Sec. 5, T22N, R11E).

Introduction

The Daysville quadrangle is situated in south central Ogle County and north central Lee County, Illinois. Map coverage extends from the southern edge of the city of Oregon, southward along the eastern side of Rock River including all or parts of Oregon, Nashua, Taylor, Chana, Nachusa, Ashton, Lafayette, and Pine Rock Townships. Most of the land is used for agricultural purposes but a small amount of residential and commercial developments are present. The area includes 3,100 acres of prairie remnants, restorations, and reconstructions in the Nachusa Grasslands, owned and operated by The Nature Conservancy, as well as approximately 4,000 forested acres in Castle Rock State Park and Lowden-Miller State Forest.

The quadrangle lies in the Rock River Hill Country of the Central Lowlands Province. The topography formed primarily by deposition of glacial sediments (clay, silt, sand, and gravel) in a till plain which was subsequently dissected by erosional processes of the Rock River and its tributaries. Bedrock in the Daysville quadrangle is largely concealed beneath the till plain except for local exposures along the river bluffs and tributary ravines as well as scattered knob-like erosional remnants (Figure 1). Throughout most of the quadrangle the glacial deposits range in thickness from 0 to 25 feet, but reach 150 feet thick in a narrow bedrock valley beneath the Kite River basin situated in the northeastern parts of the quadrangle (Piskin and Bergstrom, 1975). Surface elevations range from 885 feet on Devils Backbone ridge (NW Sec. 16, T23N, R10E) to 675 feet along the Rock River (NW Sec 20, T23N, R10E), both sites situated in the northwestern parts of the Daysville quadrangle.

The bedrock in the Daysville quadrangle was illustrated very generally on early state-wide geologic maps (Worthen 1875, Weller 1906; Weller, 1912, 1917; Weller et al., 1945; Weller et al., 1961; Willman et al., 1967; and Kolata et al., 2005), however, the first concerted investigations of the area were published by Knappen (1926) in his report on the Dixon 15' quadrangle which includes the area covered by the Daysville 7.5' quadrangle. In addition, a map showing the bedrock geology of Lee County, including the southernmost part of the Daysville quadrangle, was published by McGarry (1999). Stratigraphic and structural investigations in the Daysville area include those by Willman and Templeton (1951), Templeton and Willman (1952, 1963), Willman and Kolata (1978), and Kolata et al. (1978).

Compilation of this map is based on examination of bedrock exposures in quarries, road excavations, railroad cuts, and natural exposures along streams and waterways. Subsurface information was obtained from water well records and drill cuttings filed at the Illinois State Geological Survey (ISGS). One short run wireline log (ISGS/Lowden-Miller State Forest boring #1, IP121412607000; SE SE SW Sec. 21, T23N, R10E; N41° 57.630' W89° 20.946'; total depth 115 feet) was available in the Daysville quadrangle during this field investigation. Gamma ray and spontaneous potential logs and drill core are available for this test hole. Two reference wells situated within six miles of the southwestern corner of the Daysville quadrangle in the adjacent Dixon East quadrangle provided valuable insight to the stratigraphic succession. These include the City of Dixon water well No.10 (IP 121032353400; SW SW NW Sec. 16, T21N, R9E; N41° 48.562, W89° 28.5834842; total depth 1,748 feet) and the Dixon State School well No.3 (IP 121030009200; SW SW SW Sec. 21, T22N, R9E; N41°.874675 and W89°.472851; total depth 1,965 feet). Drill cuttings and gamma ray logs are available for both wells.

Stratigraphy

Bedrock in the Daysville quadrangle consists of Cambrian and Ordovician dolomite, sandstone, shale, and chert. Rock units portrayed on the geologic map include (in ascending order): 1) Upper Cambrian Potosi Dolomite, 2) Lower Ordovician Prairie du Chien Group, 3) Upper Ordovician Ancell Group including the St. Peter Sandstone and Glenwood Formation, and 4) the Ottawa Group including the Platteville Formation. An attempt was made to map the distribution of formations within the Prairie du Chien Group including the Gunter Sandstone, Oneota Dolomite, New Richmond Sandstone, and Shakopee Dolomite, however the paucity of definitive outcrops and subsurface information made field identification too uncertain at this time. Furthermore, the bedrock unit contacts in some parts of the Daysville quadrangle had to be inferred because of the lack of exposures.

It has been standard practice of the ISGS during the past few decades to follow the Ordovician classification and nomenclature proposed by Templeton and Willman (1963). Their stratigraphy was followed in large part by Willman and Kolata (1978) who made minor revisions to some members and documented the presence of nine widespread K-bentonite beds. These stratigraphic investigations have shown that the Late Ordovician carbonate succession consists of distinctive rock units that can be traced over wide areas of the Midcontinent U.S. Correlation of rock units is based largely on 1) relative amount of disseminated clay, 2) chert content, 3) widely traceable K-bentonite beds, and 4) hardground omission surfaces. These were the primary features used to subdivide the Platteville and Galena carbonate succession into 1 megagroup, 2 groups, 3 subgroups, 10 formations, 32 members, and 9 beds. In the outcrop area of northern Illinois where the type sections for many of the subdivisions occur, the succession ranges from a mere 300 to 350 feet thick. Compared to other Paleozoic rock units, the Illinois Upper Ordovician carbonate succession is one of most highly subdivided units in North America. Many of the formations are too thin to map at the current scale of 1:24,000, therefore do not meet the 'test of mappability' recommended in the North American Stratigraphic Code (1983). The ranks of 'megagroup and subgroup' are not recognized in the Code (1983). Based on these facts, adjustments in the ranks of the Illinois Upper Ordovician lithostratigraphic units are warranted. The simplest way to bring the Templeton and Willman (1963) and Willman and Kolata (1978) classification schemes up to code and to maintain the usefulness of the numerous recognized units is to reassign the ranks of the lithostratigraphic units. It is here proposed that the revised classification would 1) eliminate the megagroups and subgroups, 2) reassign Ottawa megagroup to the rank of group, 3) reassign Platteville, Decorah, and Galena groups to formations, 4) reassign Pecatonica, Mifflin, Grand Detour, Nachusa, and Quimbys Mill formations to members of the Platteville Formation, 5) reassign Spechts Ferry, Kings Lake and Guttenberg formations to members of the Decorah Formation, 6) reassign Dunleith, Wise Lake, and Dubuque formations to members of the Galena Formation, 7) reassign all 32 corresponding members to beds, and 8) keep the nine named K-bentonite beds (Willman and Kolata, 1978) at bed rank (Figure 2). Likewise, the Maquoketa group is reassigned to rank of formation and the Cape, Scales, Fort Atkinson, Brainard, and Neda formations to rank of members. The series and stage names as well as boundaries are also updated in recognition of the recent advancements in Ordovician chronostratigraphy.

Structural Geology

The Daysville quadrangle is situated near the termination of the Sandwich Fault Zone, Plum River Fault Zone and the projected trend of the La Salle Anticlinorium (Figure 3). Lying parallel to and south of the Sandwich Fault Zone is the Ashton Anticline. This broad anticline brings Lower Ordovician and Upper Cambrian rocks to the bedrock surface along the south side of the Sandwich Fault Zone and is responsible for the subtle southwestward dip of bedrock within the quadrangle. The dip is not measureable in the few exposures that are present because of local structural deformation. The Oregon Anticline (Bevan, 1935, 1939; Willman and Templeton, 1951), lying subparallel to and approximately 2.5 miles north of the Sandwich Fault Zone, is a subtle structure that brings the Shakopee Dolomite to the bedrock surface in the southwestern part of the adjacent Oregon quadrangle but is only weakly expressed in the northern part of the Daysville quadrangle.

The Sandwich Fault Zone extends northwesterly from near Manhattan, Will, to the Daysville and Oregon, Ogle County area, a distance of about 85 miles (Kolata et al., 1978). Where seen in outcrop or interpreted from closely spaced drilling in the Daysville area, the Sandwich Fault Zone is characterized by high-angle faults in a zone up to 2 miles wide with a cumulative displacement of 200 to 300 feet down to the north.

The fault zone is particularly well exposed in a cut along the Burlington Northern Railroad approximately one mile west of the northwest corner of the Daysville quadrangle in the NW NW SE and NE SW Sec. 7, T23N, R10E in the Grand Detour quadrangle (Willman and Templeton, 1951; Kolata et al., 1978; Kolata, 2012). The cut exposes at least 20 parallel northwest trending faults with displacements ranging from inches to more than 100 feet. Some faults are marked by zones of brecciated dolomite. One of the larger faults brings the Quimbys Mill Member of the Platteville Formation in juxtaposition with the Wise Lake member of the Galena Formation, a displacement of approximately 130 feet. Flat lying St. Peter Sandstone is exposed in ravines less than 1,000 feet southwest of the Wise Lake outcrops, indicating the presence of a concealed fault(s) that is upthrown on the southwest side with a cumulative displacement of approximately 200 feet. In total, these structural features delineate a narrow graben approximately ½ mile wide, most of which is exposed in the railroad cut. The concealed fault bounding the southern part of the graben is on trend with and has a similar magnitude as the main zone of faulting that crosses the Daysville quadrangle from SW NE SW Sec. 16 T23N, R10E through NE SW NE Sec. 32, T23N, R11E.

The faults in the in the railroad cut are on trend with outcrops of brecciated and tightly cemented St. Peter Sandstone that has been displaced by apparent faults in a northeast trending ravine in SE SE SW Sec. 6, T23N, R10E of the Daysville quadrangle. Along the same trend approximately one mile to the southeast is a similar zone of brecciated and cemented St. Peter Sandstone about 200 feet wide that is exposed on the southwest side of a prominent bluff on Highway 2 (SE NE SW Sec. 16).

Brecciated chert and dolomite marks the position of a north-trending fault involving rocks of the Potosi Dolomite, Prairie du Chien Group and St. Peter Sandstone all exposed in a road cut on the north side of Highway 2 in NE SE SE Sec. 17, T23N, R10E (Willman and Templeton, 1951). Although the fault appears to be situated immediately south of the main part of the Sandwich Fault Zone, it likely is part of the fault zone.

The main part of the Sandwich Fault Zone appears to cross the southwestern quarter of Sec. 16, T23N, R10E. Southwest of the fault zone in Sec. 16 water well records show Shakopee Dolomite to be at the bedrock surface whereas northeast of the fault zone at the same elevation the St. Peter Sandstone is present. East of the Rock River the fault zone curves southward into Sec. 27 T23N, R10E where it bends again to a more easterly direction.

From Sec. 27 eastward to Sec. 32 T23N, R11E the position of the fault zone can be inferred from several key outcrops. Flat lying Oneota Dolomite is exposed in a north trending ravine in SE NE SE Sec. 27 T23N, R10E. Approximately 1,000 feet north of here Platteville dolomite and St. Peter Sandstone cap the hills and ridges. In SW SW NW Sec. 26, T23N, R10E the St. Peter dips 30° to the south. These stratigraphic relations suggest the presences of a fault(s) with approximately 300 feet of displacement down to the north. Continuing eastward the general position of the fault zone is indicated by faulted and sheared Platteville dolomite in an abandoned quarry in SW SE SE Sec. 25, T23N, R10E. The Sandwich Fault Zone can also be inferred from outcrops farther to the east in the northern part of Sec. 31, T23N, R11E. In a small quarry in NW NW NE Sec. 31 the lower part of the Platteville Formation dips 10° to the north, whereas flat lying Oneota Dolomite is exposed in an east-west trending ravine approximately 700 feet to the south. Here too the fault zone has a total displacement of approximately 300 feet down to the north.

Other notable structures in the Daysville quadrangle include an apparent horst block that brings Prairie du Chien rocks to the bedrock surface in juxtaposition with the Ancell Group in Sec. 29 and 30 T23N, R11E. This feature was interpreted by Willman and Templeton (1951) to be part of the Oregon Anticline, however the presence of brecciated chert and dolomite exposed in NW SW NE Sec. 30 suggests that faulting is involved. Another notable feature is a small graben in NE Sec. 17, T22N, R10E that brings an outlier of Platteville dolomite down in juxtaposition with St. Peter Sandstone.

Economic Resources

Dolomite
In Ogle and Lee Counties dolomite is widely quarried for use as aggregate, road surfacing material, agricultural lime, and rip-rap. Dolomite is currently produced from the Oneota Dolomite at the Machlin Quarry in the southeastern part of the quadrangle (N½ NW Sec. 20, T22N, R11E).

Silica Sand
Silica Sand is currently mined from the St. Peter Sandstone at the UNIMIN Corporation quarries in Sec 8, T23N, R10E. The sand has long been used in the glass making and foundry sand industries but more recently it has been produced for use as a proppant (frac sand) in the oil and gas industry.

Groundwater
Residential wells in the Daysville quadrangle recover groundwater largely from fractured dolomite in the Platteville and Galena Formations or from the underlying St. Peter Sandstone. Most of these wells are drilled in the range of 150 to 300 feet deep. Municipal wells in the area tend to draw water from Cambrian sandstone aquifers at depths of approximately 1,800 feet.

Acknowledgments

We thank the numerous landowners who allowed us onto their land for outcrop study. We appreciate the help and assistance provided by Bruce Marlin and Susan Klieman of The Nature Conservancy Nachusa Grasslands and Grant Afflerbaugh, Site Superintendent of Castle Rock State Park. Jacquelyn L. Hannah provided field assistance. Special thanks go to Donald E. Luman for the Lidar maps and to Jennifer Carrell for the graphic and cartographic layout and design. This research was supported in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program (STATEMAP) under USGS award number G13AC00240. 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.

References

Bevan, A.C., 1935, Cambrian inlier at Oregon, Illinois: Kansas Geological Society Guidebook, 9th Annual Field Conference, p. 383-385.

Bevan, A.C. 1939, Cambrian inlier in northern Illinois: American Association of Petroleum Geologists Bulletin, v. 23, no. 10, p. 1561-1564.

Knappen, R.S., 1926, Geology and mineral resources of the Dixon Quadrangle: Illinois State Geological Survey Bulletin 49, 141p.

Kolata, D.R. (compiler), 2005, Bedrock geology of Illinois: Illinois State Geological Survey, 1:500,000.

Kolata, D.R., 2012, Bedrock Geology of the Grand Detour 7.5' quadrangle: Illinois State Geological Survey, Illinois Geologic Quadrangle Map IGQ Grand Detour-BG.

Kolata, D.R., T.C. Buschbach, and J.D. Treworgy, 1978, The Sandwich Fault Zone of Northern Illinois: Illinois State Geological Survey Circular 505, 26 p.

Kolata, D.R., and A.M. Graese, 1983, Lithostratigraphy and depositional environments of the Maquoketa Group (Ordovician) in northern Illinois: Illinois State Geological Survey Circular 528, 49 p.

McGarry, C.S., 1999, Bedrock geology of Lee County, Illinois: Illinois State Geological Survey, OFS 1999-1e Lee BG.

North American Stratigraphic Code, 1983, American Association of Petroleum Geology Bulletin, v. 67, p. 841-875.

Piskin, K., and S.M. Bergström, 1975, Glacial drift in Illinois: Thickness and character: Illinois State Geological Survey Circular 490, 35 p.

Templeton, J.S. and H.B. Willman, 1963, Champlainian Series (Middle Ordovician) in Illinois: Illinois State Geological Survey Bulletin 89, 260 p.

Weller, Stuart, 1906, The geologic map of Illinois: Illinois State Geological Survey Bulletin 1, 24 p.

Weller, S., 1912, Provisional geologic map of Illinois: Illinois State Geological Survey, 1:500,000.

Weller, S., 1917, Geologic map of Illinois: Illinois State Geological Survey, 1:500,000.

Weller, J.M., A.H. Bell, and G.H. Cady, 1945, Geologic map of Illinois: Illinois, Illinois State Geological Survey, 1:500,000.

Weller, J.M., G.H. Cady, A.H. Bell, J.E. Lamar, and G.E. Ekblaw, 1961, Geologic map of Illinois: Illinois State Geological Survey, 1:500,000.

Willman, H.B., and T.C. Buschbach, 1975, Ordovician System in Willman et al. (editor) Handbook of Illinois Stratigraphy: Illinois State Geological Survey, Bulletin 95, 261 p.

Willman, H.B., and D.R. Kolata, 1978, The Platteville and Galena Groups in Northern Illinois: Illinois State Geological Survey Circular 502, 75 p.

Willman, H.B., J.C. Frye, J.A. Simon, K.E. Clegg, D.H. Swann, E. Atherton, C. Collinson, J.A. Lineback, and T.C. Buschbach, 1967, Geologic map of Illinois: Illinois State Geological Survey, 1:500,000.

Worthen, A.H., 1875, Geological map of Illinois: Geological Survey of Illinois, v. 6.

Willman, H.B., and J.S. Templeton, 1951, Cambrian and lower Ordovician exposures in northern Illinois: Illinois Academy of Science Transactions, v. 44, p. 109-125.

Figure 1 Natural outcrop of St. Peter Sandstone exposed in the Nachusa Grasslands (NE NE SW Sec. 21, T22N, R10E). Strata dip 8° southwestward.

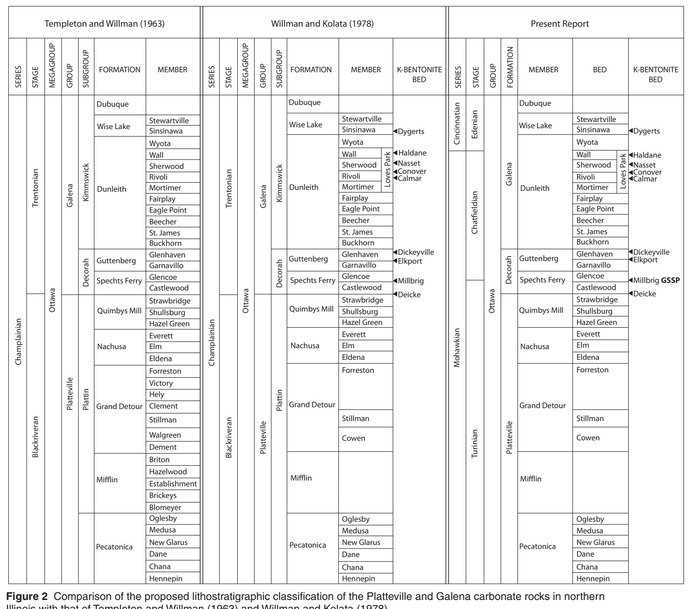


Figure 2 Comparison of the proposed lithostratigraphic classification of the Platteville and Galena carbonate rocks in northern Illinois with that of Templeton and Willman (1963) and Willman and Kolata (1978).

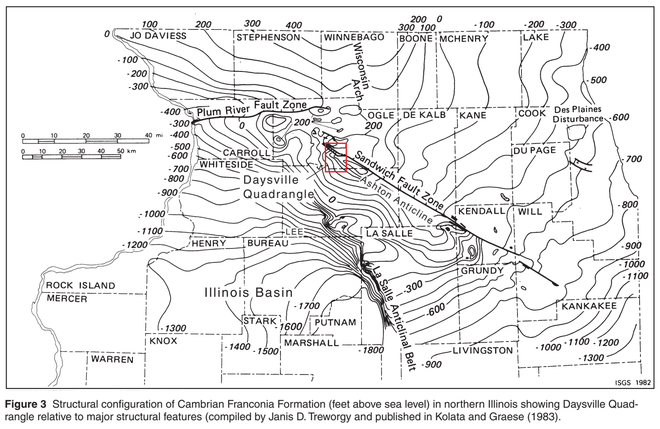


Figure 3 Structural configuration of Cambrian Franconia Formation (feet above sea level) in northern Illinois showing Daysville Quadrangle relative to major structural features (compiled by Janis D. Treworgy and published in Kolata and Graese (1983).