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Subcrop area of Galena-Platteville
Batten, W.G., Brown, T.A., Mills, P.C., and Sabin, T.J., 1995, Rock-Stratigraphic Nomenclature, Lithology, and Subcrop Area of the Galena-Platteville Bedrock Unit in Illinois and Wisconsin

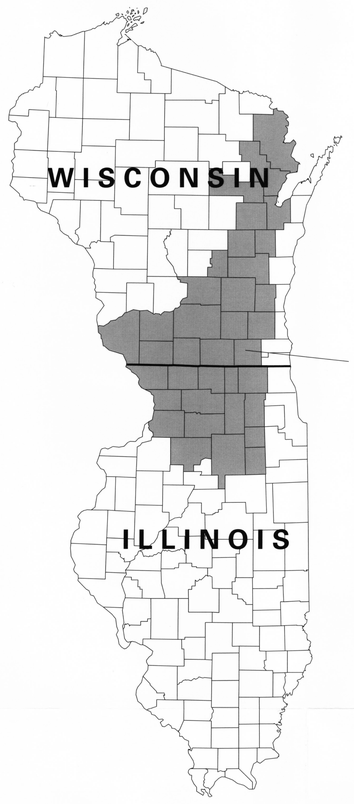

Figure 1. Study area of the Galena-Platteville bedrock unit in Illinois and Wisconsin.

ILLINOIS			WISCONSIN		
Galena Group		Dubuque Formation	Sinnipee Group	Galena Dolomite	Dubuque Member
	Kimmswick Subgroup	Wise Lake Formation			Wise Lake Member
		Dunleith Formation			Dunleith Member
	Decorah Subgroup	Guttenberg Formation		Decorah Formation	Guttenberg Member
		Spechts Ferry Formation			Spechts Ferry Member
Platteville Group	Plattin Subgroup	Quimbys Mill Formation		Platteville Formation	Quimbys Mill Member
		Nachusa Formation			McGregor Member
		Grand Detour Formation			
		Mifflin Formation			
		Pecatonica Formation			Pecatonica Member

Figure 2. Correlation of Galena-Platteville rock-stratigraphic nomenclature in Illinois and Wisconsin. Nomenclature is that of the Illinois State Geological Surveyand the Wisconsin Geological and Natural History Survey, respectively (modified from Willman and Kolata, 1978, fig. 1, and Ostrom, 1967).

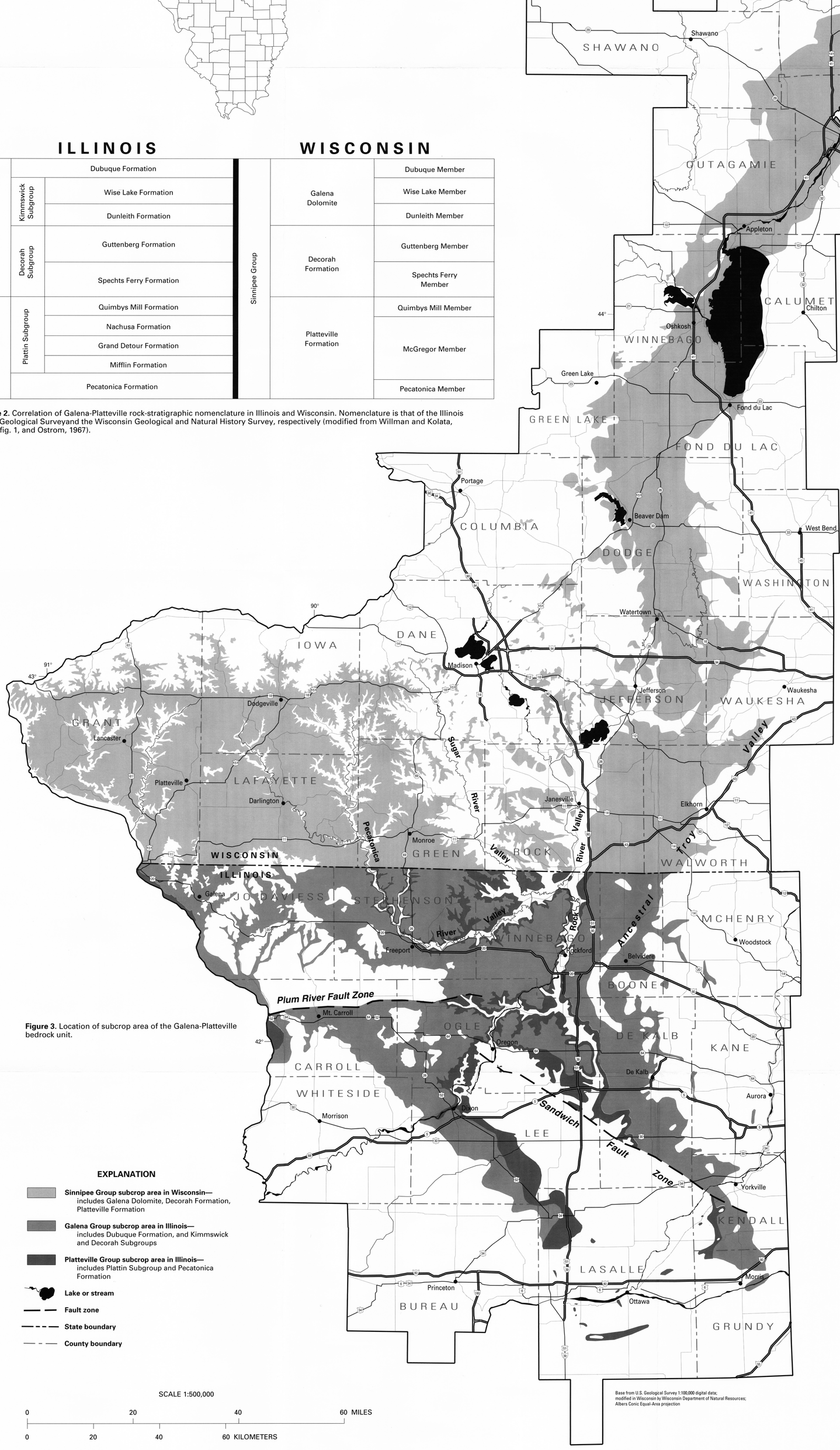

Figure 3. Location of subcrop area of the Galena-Platteville bedrock unit.

EXPLANATION

- **Sinnipee Group subcrop area in Wisconsin—** includes Galena Dolomite, Decorah Formation, Platteville Formation
- **Galena Group subcrop area in Illinois—** includes Dubuque Formation, and Kimmswick and Decorah Subgroups
- **Platteville Group subcrop area in Illinois—** includes Plattin Subgroup and Pecatonica Formation
- **Lake or stream**
- **Fault zone**
- **State boundary**
- **County boundary**

SCALE 1:500,000

0 20 40 60 MILES

0 20 40 60 KILOMETERS

INTRODUCTION

The Galena-Platteville bedrock unit is a dependable source of ground water for many private well owners and some municipal-water-supply systems in northern Illinois (Hackett, 1960) and in Wisconsin. The carbonate lithology of the unit contributes to the availability of ground water and also to the susceptibility of the unit to ground-water contamination. Susceptibility to contamination is greatest in areas where the unit is overlain by only a thin layer (less than 50 feet) of soil or unconsolidated glacial deposits.

Within the study area in Illinois and Wisconsin (fig. 1), volatile organic compounds and other contaminants have been detected in ground-water samples from various sites (Kay and others, 1989; Mills, 1993a, 1993b; Kay and others, 1994). Known and suspected sources of contaminants are numerous, including landfills and industrial facilities. To determine the possible effects of contamination on the ground-water supply, an understanding of the regional hydrogeologic framework of the Galena-Platteville bedrock unit is needed.

Published map and point data describing the geologic and hydrologic properties of the Galena-Platteville bedrock unit are available from many sources. The U.S. Geological Survey, in cooperation with the U.S. Environmental Protection Agency, Region 5, has selected and compiled pertinent data. The objective of this study is to publish these data in a series of concise map reports and a bibliographic report listing available sources of information by county for the Galena-Platteville bedrock unit. Investigators involved in site-specific studies within the subcrop area will be able to utilize these reports to design effective site investigations.

This report presents the rock-stratigraphic nomenclature of the lithologic units that make up the Galena-Platteville bedrock unit (fig.2) and provides a brief, generalized description of the lithologic characteristics of each unit. Sources with more detailed descriptions of lithology can be found below in SELECTED REFERENCES. Figure 3 is a map, created from published maps of various scales, showing the areal extent of the Galena-Platteville subcrop and major known geologic structural features in Illinois and Wisconsin. The subcrop area of the Galena-Platteville bedrock unit is that area where the unit crops out, or is the uppermost bedrock unit and is overlain by soil or glacial deposits. The unit is present at depth under younger bedrock units south and east of the subcrop area and is absent north and west of the subcrop area. Data sources used to prepare the map are included in SELECTED REFERENCES.

ROCK-STRATIGRAPHIC NOMENCLATURE AND LITHOLOGIC CHARACTERISTICS

The Galena-Platteville bedrock unit is of Ordovician age and is the uppermost bedrock unit in the subcrop area. The name "Galena-Platteville bedrock unit", as used in this report, represents a group of three recognized Ordovician-aged rock units in Illinois and Wisconsin. From oldest to youngest, these units are the Platteville Formation, the Decorah Formation, and the Galena Dolomite in Wisconsin, and the Platteville and Galena Groups in Illinois. Rock-stratigraphic nomenclatures currently used in Illinois and Wisconsin are shown and correlated in figure 2. The Galena Dolomite and the Decorah and Platteville Formations make up the Sinnipee Group (Ostrom, 1967) in Wisconsin. In Illinois, the Decorah is one of two subgroups of the Galena Group. Together, the Platteville and the Galena Groups in Illinois are directly correlated to the Sinnipee Group in Wisconsin (fig. 2).

The three formations that make up the Sinnipee Group in Wisconsin are further divided into eight members (fig. 2). The Platteville and Galena Groups of Illinois are subdivided into 10 formations. Formation names in Illinois are similar but not identical to member names in Wisconsin (fig. 2), but the nomenclatures are similar enough for purposes of discussion.

Detailed descriptions of all formations that make up the Platteville and Galena Groups in Illinois are presented in Willman and Kolata (1978). This work is based on examinations of outcrops primarily in north-central and northwestern Illinois. It includes descriptions of the lithology and thickness, and discussions of the areal distribution and stratigraphic relations of more than 30 members that make up the 10 formations in the subcrop area of northern Illinois.

Rock-stratigraphic classifications of the Galena-Platteville bedrock unit are primarily based on commonly subtle variations in the weathering appearance of the carbonate strata (Willman and Kolata, 1978). Slight variations in the clay and silt content contribute to differences in texture and density, extent of dolomitization, and weathering color. Classification is also based on chert content, shale partings, bentonite beds, corrosion surfaces, calcarenites, and some fossils. Because of the generally subtle variations in carbonate lithology and the historical reliance on weathering appearance for classification, differentiation of the various units in the subsurface (by drill-cuttings or rock-core analysis) can be quite difficult (Michael Sargent, Illinois State Geological Survey, oral communication, 1994).

The following paragraphs briefly summarize the dominant lithologies, from oldest to youngest, of the Platteville and Galena Groups as described by Willman and Kolata (1978). These descriptions can also be applied to corresponding Galena-Platteville bedrock units (Sinnipee Group) in southern Wisconsin.

The Pecatonica Formation (fig. 2) is a brown, medium-bedded, dense dolomite, and is the basal formation of the Galena-Platteville bedrock unit. At some locations this formation also may be present as a gray, fine-grained to lithographic limestone or have a finely vessicular texture and large chert nodules. The Pecatonica Formation is separated from the overlying Plattin Subgroup by a deeply pitted, iron-stained corrosion surface (Willman and Kolata, 1978).

The Plattin Subgroup is a slightly argillaceous, thin- to thick-bedded dolomite or lithographic limestone. The thin-bedded zones tend to contain brown shaley partings. With the exception of the basal Mifflin Formation (fig. 2), many members are locally cherty. The overall thickness of the Platteville Group (Pecatonica Formation and Plattin Subgroup) ranges from 45 to 135 feet and is generally about 100 feet thick.

The Decorah Subgroup (fig. 2) is a shaley, fine-grained limestone or dolomite with numerous interbedded brown, red, and green shale layers. The overall thickness of the Decorah Subgroup is less than 30 feet.

The Kimmswick Subgroup is a predominately pure, medium- to thick-bedded vuggy dolomite. Locally, the unit may consist of limestone. It is particularly cherty near the bottom of the unit with some thin shale layers and bentonite beds.

The youngest of the Galena-Platteville bedrock units is the Dubuque Formation, which consists of well-delineated, flat-bedded, shaley dolomite separated by thin shale partings.

The Kimmswick Subgroup and the Dubuque Formation make up the Galena Dolomite of Wisconsin and the upper part of the Galena Group of Illinois. The combined thickness of the Kimmswick Subgroup and the Dubuque Formation in southern Wisconsin and northern Illinois is 250 to 275 feet where erosion is not significant.

SUBCROP AREA

The subcrop area of the Galena-Platteville bedrock unit is shown in figure 3 (see INTRODUCTION for definition of "subcrop area"). This map is a compilation of the most detailed published map data available in 1993. Sources of information range from small-scale, state-wide geologic maps to large-scale maps of county studies. The contact between the Galena Group and Platteville Group is shown because it has been mapped in Illinois (Willman and Kolata, 1976). However, this contact is not delineated on maps of the Galena-Platteville bedrock unit in Wisconsin. Well-log data were used to adjust slight differences in contact location along State and county boundaries. All data sources used in preparing this map are listed in SELECTED REFERENCES.

The subcrop area of the Galena-Platteville bedrock unit underlies parts of 21 counties in Wisconsin and 15 counties in Illinois (fig. 1). Many major structural features have been mapped within the study area. These features include bedrock valleys formed by erosion, and faults, anticlines (arches) and synclines resulting from crustal movement. The faults and eroded bedrock valleys are particularly important because some form the boundaries of the subcrop area.

The Sandwich Fault Zone is located in the southeastern part of the study area in Illinois (fig. 3). In southern De Kalb County, the Sandwich Fault forms the boundary between the Galena-Platteville bedrock unit and older stratigraphic units. The Plum River Fault Zone is present in the western part of the study area in Illinois. This fault forms a boundary between the Galena Group and younger stratigraphic units in Carroll and Ogle Counties.

In the central part of the study area, part or all of the Galena-Platteville bedrock unit has been eroded during the late Paleozoic by rivers that formed deep valleys in the bedrock surface. Examples of this are the present-day Pecatonica and Sugar River valleys which extend from Dane, Iowa, Lafayette, Rock, and Green Counties of Wisconsin into Stephenson and Winnebago Counties of Illinois, and the present-day Rock River valley which extends from Jefferson and Rock Counties of Wisconsin into Winnebago, Ogle, and De Kalb Counties of Illinois (fig. 3). These valleys are generally narrow (valley floor less than one mile wide) with sharp slopes and narrow, deeply incised tributaries (Hackett, 1960) and have been partly filled by recent alluvial or glacial deposits. The ancestral Troy Valley (Green, 1968), a valley similarly eroded but subsequently filled and "buried" by glacial deposits underlies parts of Waukesha and Walworth Counties in Wisconsin and extends into Boone, Winnebago, Ogle, and De Kalb Counties in Illinois (fig. 3). The entire thickness of the Galena-Platteville bedrock unit has been eroded along the axis of the lower reaches of these bedrock valleys, thus exposing older, underlying bedrock units.

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* Larger scale map (final work draft) available for inspection at USGS-WRD, Wisconsin District Office.

ROCK-STRATIGRAPHIC NOMENCLATURE, LITHOLOGY, AND SUBCROP AREA OF THE GALENA-PLATTEVILLE BEDROCK UNIT IN ILLINOIS AND WISCONSIN

by
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