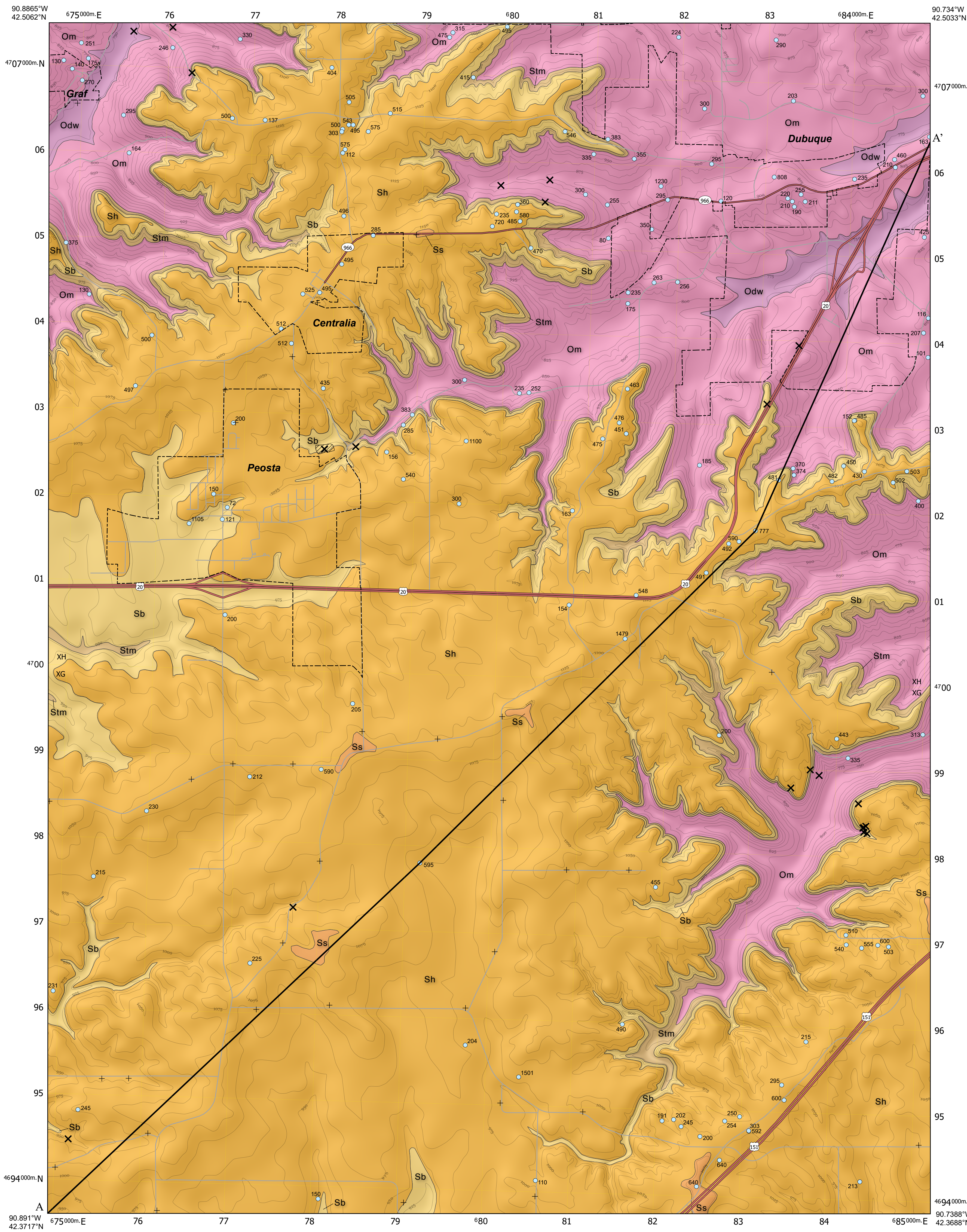


BEDROCK GEOLOGIC MAP OF THE PEOSTA 7.5' QUADRANGLE, DUBUQUE COUNTY, IOWA

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INTRODUCTION

The Peosta 7.5' Quadrangle is situated on the boundary between the East-Central Drift Plain and the Paleozoic Plateau landform regions. The East-Central Drift Plain dominates the mapping area and is bounded by the Silurian Escarpment, a prominent ridge of resistant Silurian dolostones, along the eastern and northern portions of the mapping area. Both landform regions are characterized by thin (<30 feet) glacial deposits of loess and/or till draped over Silurian- and Ordovician-age bedrock units.

The bedrock of the Peosta Quadrangle is dominated by strata of the Silurian System. The Silurian succession consists of fossiliferous dolomite with variable chert. The eastern and northern portions of the mapping area, the Paleozoic Plateau landform region, are underlain by strata of the Ordovician System. The uppermost Ordovician units begin with shales of the Maquoketa Formation overlying carbonate rocks of the Galena Group. The Maquoketa consists of two mappable members: the upper Brainerd Member consisting of shale and argillaceous dolomite and the basal Elgin Member comprising fossiliferous dolomite and phosphatic shale. The Galena Group consists of four formations, in descending order: Dubuque, Wise Lake, Dunleith, and Decorah. The Dubuque, Wise Lake, and Dunleith formations are dolomite, with chert occurring in the Dunleith. The Decorah represents a notable change in lithology, including fossiliferous limestone and shale. A distinct green-gray shale marks the base of the Decorah. Underlying the Decorah Formation is the Platteville Formation, consisting of an upper fossiliferous limestone and a lower fossiliferous sandy and phosphatic dolomite. Below the Platteville is the Glenwood Formation, a thin (<10 feet) shale overlying the St. Peter Formation. The St. Peter Formation, a high-purity quartz sandstone typically less than 50 feet thick, is observed to fill apparent paleovalley or paleokarst features where it abruptly expands to over 395 feet thick. The base of the Ordovician succession in the mapping area is the Prairie du Chien Group consisting of the Shakopee and Onocota formations. The Shakopee Formation consists of sandy dolomite, minor sandstone, and traces of chert. The underlying Onocota Formation is also a dolomite with more chert and less sand than the Shakopee.

Numerous bedrock exposures exist in the mapping area, primarily exposing dolostones of the Silurian System along the escarpment as well as Maquoketa and Galena Group carbonates along road cuts and stream valleys. There is an active quarry in the quadrangle located near the town of Peosta. Geologic reconnaissance of 23 bedrock outcrops and one quarry within the mapping area were conducted during field activities. Additional subsurface information was derived from the analysis of over ~150 borehole records, 91 of which have lithologic strip logs. A total of 81 strip logs were created for this mapping project. A single stratigraphic rock core was drilled to assess local stratigraphic variability not captured in well cuttings, to verify thicknesses of select map units, and to collect carbonate carbon isotope ($\delta^{13}C$) chemostratigraphic samples to construct a chemostratigraphic framework for the Paleozoic succession in the Dubuque County area. To determine the depth to bedrock in areas without adequate well control, 37 passive seismic points were collected within and immediately outside the map area. For further detail about the bedrock elevation and Quaternary thickness of the Peosta 7.5' Quadrangle please refer to OFM-25-13.

STRATIGRAPHIC COLUMN AND LEGEND

System	Global Series	Global Stage	Regional Series	Regional Stage	Group	Formation	Map Symbol	Lithology	Thickness (in feet)	Lithostratigraphic Unit Description
SILURIAN	WISCONSIN WISCONSIN SHERAN CHIAN WOODRAN	LLANDOVERY	AERONIAN	RHUDDANIAN	RICHMUNDIAN	Quaternary undifferentiated	Qu	[Symbol]	0-75	Qu - Undifferentiated Unconsolidated Sediments - Loamy soils developed in loess, glacial diamicton, and colluvium of variable thickness, and alluvial clay, silt, sand, and gravel. The total thickness of the Quaternary deposits varies across the cross-section, not on the map.
						Scotch Grove	Ss	[Symbol]	<30	Ss - Dolomite - The Scotch Grove Formation is found as discontinuous outcrops along high ridges reaching a maximum thickness of 30 ft (9 m) across the mapping area. This unit consists of fine to medium crystalline dolomite with scattered oolitic fossils and rare chert. Crinoids are the dominant fossils of this unit with lesser brachiopods, bryozoa, and corals. This unit was not observed in exposure and was not encountered in any subsurface logs; however, the known thickness of the underlying Hopkinton Formation indicates that scattered outcrops occur within the map area.
						Hopkinton	Sh	[Symbol]	50-135	Sh - Dolomite and Chert - The Hopkinton Formation dominates the bedrock surface of the southern half of the mapping area, reaching a maximum thickness of 135 ft (41 m). This unit consists of fine to medium crystalline dolomite, skeletal nodules in part, and scattered to abundant chert in the lower half of the unit. Fossil molds and fabrics are dominated by sponges and brachiopods; pentamerids most notable including highly porous zones, and colonial corals, stromatoporoids, bryozoa, and trilobites also occur in this unit.
						Blanding	Sb	[Symbol]	25-65	Sb - Dolomite and Chert - The Blanding Formation is a cherty dolomite unit ranging from 25 to 65 ft (8 - 20 m) thick in the mapping area. Dolomite lithologies appear similar to the Hopkinton however abundant chert nodules, bands, and distinct beds typify this unit. The chert is typically white but may also be shades of buff and gray; it occurs as both tripolitic (cherty) and smooth varieties.
						Tete des Morts	Stm	[Symbol]	10-105	Stm - Dolomite - The Tete des Morts and Mosalem formations mark the base of the Silurian and vary in thickness from 10 to 105 ft (3 - 32 m). The Mosalem Formation is a wavy-bedded, argillaceous dolomite with chert nodules and shale partings. This unit exhibits wide thickness variations over short distances, which is interpreted as the result of filling in paleovalleys on the eroded Maquoketa Formation surface. The Tete des Morts Formation is an argillaceous, massively bedded dolomite. The Tete des Morts and Mosalem formations towards the east within the mapping area. These units were mapped as a single unit due to the thickness variations and difficulty of differentiation in subsurface well logs.
						Mosalem	Stm	[Symbol]	10-105	Stm - Dolomite - The Tete des Morts and Mosalem formations mark the base of the Silurian and vary in thickness from 10 to 105 ft (3 - 32 m). The Mosalem Formation is a wavy-bedded, argillaceous dolomite with chert nodules and shale partings. This unit exhibits wide thickness variations over short distances, which is interpreted as the result of filling in paleovalleys on the eroded Maquoketa Formation surface. The Tete des Morts Formation is an argillaceous, massively bedded dolomite. The Tete des Morts and Mosalem formations towards the east within the mapping area. These units were mapped as a single unit due to the thickness variations and difficulty of differentiation in subsurface well logs.
						Maquoketa	Om	[Symbol]	100-270	Om - Shale, Dolomite, and Phosphatic - The Maquoketa Formation reaches a maximum thickness of 270 ft (82 m) within the mapping area. The Maquoketa is expressed as gentle slopes between the Silurian Escarpment above and the cliff-forming carbonates of the Galena Group below. This unit consists of three members (in ascending order): Elgin, Brainerd, and Noda. The Elgin Member (known as the Scales Shale Member in Illinois) consists of argillaceous dolomite and interbedded brown-gray shale where it is thickest (70 ft) and grades to shale south and east of the mapping area where it thins to less than 20 feet. The dolomite facies of the Elgin Member is locally fossiliferous with several banded packstone beds. The lower half of the Elgin is typified by gray-brown organic and phosphatic shales, often with abundant graptolite fossils, and a basal granular phosphatic horizon. The basal Maquoketa phosphatic overlies a sculpted background surface developed on the uppermost Galena Group (Dubuque Formation) and hosts an abundant diminutive fauna. The Brainerd Member is a green-gray, occasionally blue, dolomite massive with notable pyritic nodules. Thin argillaceous dolomite stringers appear locally throughout the member and some may be fossiliferous, displaying excellent preservation. The Brainerd represents a widespreadly separated segment of the Galena aquifers. The Noda Member is a thin (<5 ft) discontinuous shale that contains abundant iron oxides giving the unit a notable dark red hue. The Noda is typically preserved only where the full thickness of the Maquoketa Formation avoided extensive pre-Silurian erosion. This unit was not observed in exposure, however several subsurface logs showed iron oxides and concretions within the mapping area.
						Dubuque	Odw	[Symbol]	100-135	Odw - Dolomite - The Dubuque and Wise Lake formations are the upper two formations of the Galena Group and range in thickness from 100 to 135 ft (30 - 41 m). The Wise Lake Formation is a massive, wavy bedded dolomite with a highly fossiliferous, well-sorted, and displays a distinct popcorn texture on weathered exposure surfaces. This unit has solutionally-widened fractures that host galena and sphalerite and iron ore, presumably from the host dolomite. This unit is a dolomite, representing the quartzite "Mississippi Valley Type" (MVT) zinc-lead mineralization that led to the development of the mining district. Fossils in the Wise Lake are sparse, however a distinctive radiolarians (aka sunflower corals) occur near the base of the unit. The uppermost member of the Galena Group is the Dubuque Formation which is a blue- to medium-bedded dolomite to dolomitic limestone with thin interbedded shales. The dolomitic limestone facies hosts abundant crinoids. The Dubuque Formation has a distinct background surface at the top that is often karsted with irregularly shaped vugs that are commonly filled with calcite and lesser pyrite, sphalerite, marcasite, and galena. This unit is typically less than 40 ft (12 m) thick. The Dubuque and Wise Lake formations were mapped as a single unit due to the gradational nature of their contact and similar lithologies. This is the lowest most unit exposed at the surface in the map area.
						Wise Lake	Odw	[Symbol]	100-135	Odw - Dolomite - The Dubuque and Wise Lake formations are the upper two formations of the Galena Group and range in thickness from 100 to 135 ft (30 - 41 m). The Wise Lake Formation is a massive, wavy bedded dolomite with a highly fossiliferous, well-sorted, and displays a distinct popcorn texture on weathered exposure surfaces. This unit has solutionally-widened fractures that host galena and sphalerite and iron ore, presumably from the host dolomite. This unit is a dolomite, representing the quartzite "Mississippi Valley Type" (MVT) zinc-lead mineralization that led to the development of the mining district. Fossils in the Wise Lake are sparse, however a distinctive radiolarians (aka sunflower corals) occur near the base of the unit. The uppermost member of the Galena Group is the Dubuque Formation which is a blue- to medium-bedded dolomite to dolomitic limestone with thin interbedded shales. The dolomitic limestone facies hosts abundant crinoids. The Dubuque Formation has a distinct background surface at the top that is often karsted with irregularly shaped vugs that are commonly filled with calcite and lesser pyrite, sphalerite, marcasite, and galena. This unit is typically less than 40 ft (12 m) thick. The Dubuque and Wise Lake formations were mapped as a single unit due to the gradational nature of their contact and similar lithologies. This is the lowest most unit exposed at the surface in the map area.
						Dunleith	Odu	[Symbol]	<135	Odu - Dolomite and Chert - The Dunleith Formation achieves a maximum thickness of 135 ft (41 m) within the mapping area. The Dunleith is a massive dolomite with white-gray chert nodules and bands throughout the unit and is much less vuggy. Radiolarians and algae fossils are common in portions of this unit as are MVT deposits, which are usually found within subvertical fracture networks or along bedding planes. The Dunleith transitions to dolomitic limestone near the base, and the contact between the Dunleith and Decorah is gradational. This unit appears only in the cross-section.
Decorah	Ode	[Symbol]	<40	Ode - Limestone and Shale - The Decorah Formation averages 40 ft (12 m) in thickness within the mapping area. The Decorah Formation stands out from the rest of the Galena Group formations with its shaly lithology and abundance of fossils, primarily brachiopods and crinoids. This unit consists of three members (in ascending order): Speciosa Ferry, Guttenberg, and Ion. The Speciosa Ferry Member is a green-gray shale, typically less than 15 feet thick, containing limestone lenses rich with shaly-bedded brachiopod debris. The Guttenberg Member is a dense, wavy-bedded limestone, interbedded with dark brown shales. This unit is fossiliferous and ranges from 10 to 25 feet thick. The Ion Member is an argillaceous and fossiliferous dolomitic limestone usually not more than 15 feet thick. This unit appears only in the cross-section.						
ORDOVICIAN	MIDDLE DARRELLIAN WILLAN	SANDSIAN	MOHAWKIAN	CHATHFIELDIAN	GALENA GROUP	Platteville	Op	[Symbol]	40-60	Op - Limestone and Dolomite - The Platteville Formation is a carbonate unit ranging from 40 to 60 ft (12 - 18 m) in thickness. This unit consists of two members in the mapping area, the McGregor and underlying Peconica. The McGregor Member is a wavy-bedded, fossiliferous limestone with abundant brachiopods along with crinoids, sponges, bryozoa, corals, and ostracodes. The Peconica Member is an argillaceous to sandy, dolomite with small fossil molds and phosphatic grains and pellets, especially in the lower part. This unit appears only in the cross-section.
						Glenwood	Glenwood	[Symbol]	40-60	Glenwood - Limestone and Shale - The Anzell Group consists of the St. Peter and Glenwood formations, mapped as one unit because the Glenwood is typically less than 2 ft (0.6 m) thick. The St. Peter Formation is a fine to medium grained, friable, well-sorted, well rounded (often with frosted grains), quartz sandstone, typically about 50 ft (15 m) thick. The sandstone is white but due to iron oxide staining can display shades of red. The thickness of the St. Peter can vary widely over short distances (see cross-section) expanding to more than 395 ft (120 m) thick within the mapping area. This variation is due to infilling of paleochannels and/or paleokarst features occurring on the eroded surface of the underlying Prairie du Chien Group. The Glenwood Formation is a green-gray, non-calcareous shale that is locally discontinuous. This unit appears only in the cross-section.
						St. Peter	St. Peter	[Symbol]	40-395	St. Peter - Limestone and Shale - The Anzell Group consists of the St. Peter and Glenwood formations, mapped as one unit because the Glenwood is typically less than 2 ft (0.6 m) thick. The St. Peter Formation is a fine to medium grained, friable, well-sorted, well rounded (often with frosted grains), quartz sandstone, typically about 50 ft (15 m) thick. The sandstone is white but due to iron oxide staining can display shades of red. The thickness of the St. Peter can vary widely over short distances (see cross-section) expanding to more than 395 ft (120 m) thick within the mapping area. This variation is due to infilling of paleochannels and/or paleokarst features occurring on the eroded surface of the underlying Prairie du Chien Group. The Glenwood Formation is a green-gray, non-calcareous shale that is locally discontinuous. This unit appears only in the cross-section.
						Shakopee	Os	[Symbol]	<140	Os - Dolomite and Sandstone - The Shakopee Formation is the uppermost formation of the Prairie du Chien (P&C) Group and consists of a massive, wavy-bedded, fossiliferous limestone with abundant brachiopods along with crinoids, sponges, bryozoa, corals, and ostracodes. The Peconica Member is an argillaceous to sandy, dolomite with small fossil molds and phosphatic grains and pellets, especially in the lower part. This unit appears only in the cross-section.
						Onocota	Oo	[Symbol]	160-220	Oo - Dolomite and Chert - The Onocota Formation is a pure crystalline dolomite with abundant chert in the upper two-thirds and minor sand in the lower one-third. This unit ranges from 160 to 220 ft (49 - 67 m) thick in the mapping area. Oolitic fabrics are notable in both the dolomite and chert facies. Chert appears as white and gray nodules in both tripolitic and smooth varieties. This unit appears only in the cross-section.

ADJOINING QUADRANGLES		
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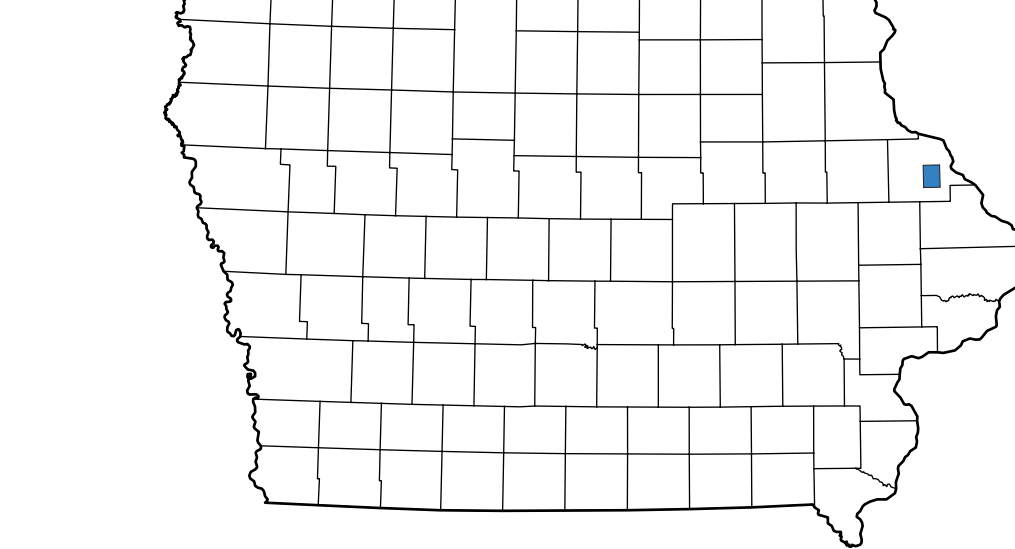
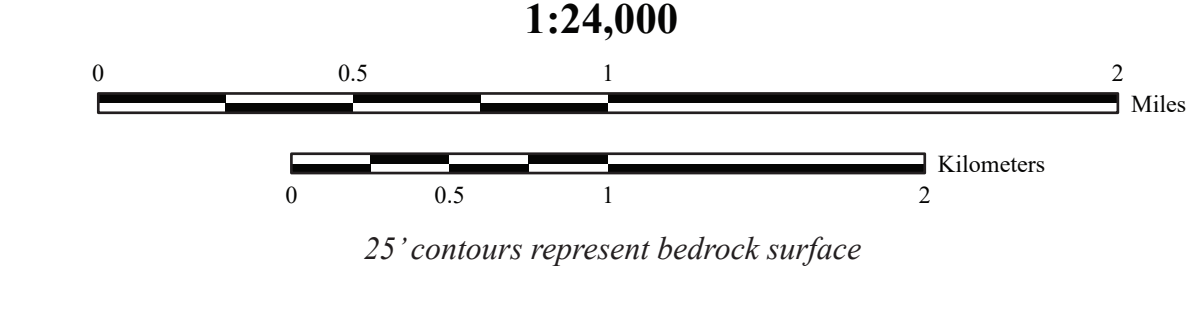
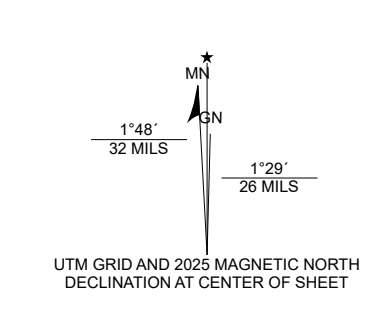
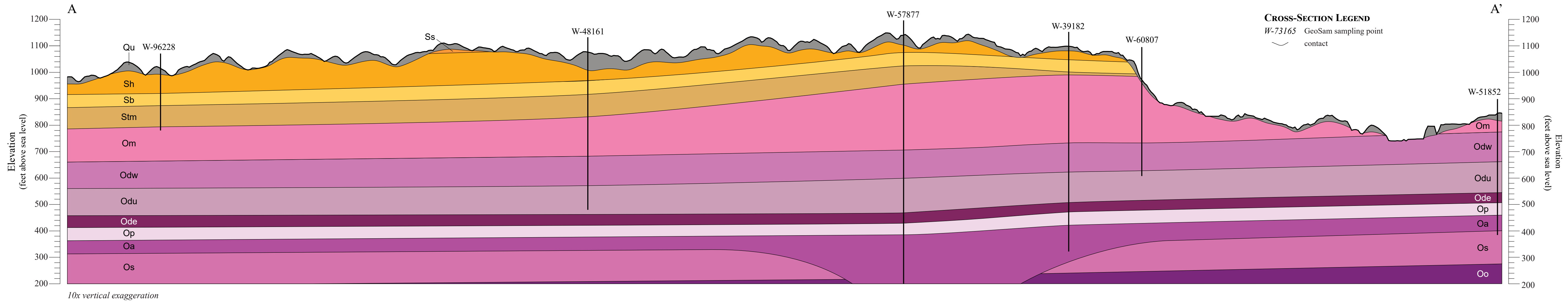


Figure 1. The location of the Peosta Quadrangle in Iowa.

GEOLOGIC CROSS-SECTION A-A'



Geology based on fieldwork done by J. Malone and R. Clark 2023-2025. Digital cartography by P. Kerr. Base map generated from the Iowa Geospatial Data Clearinghouse. Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 15N, Datum NAD83.

The map and cross-section are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site-specific studies. 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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