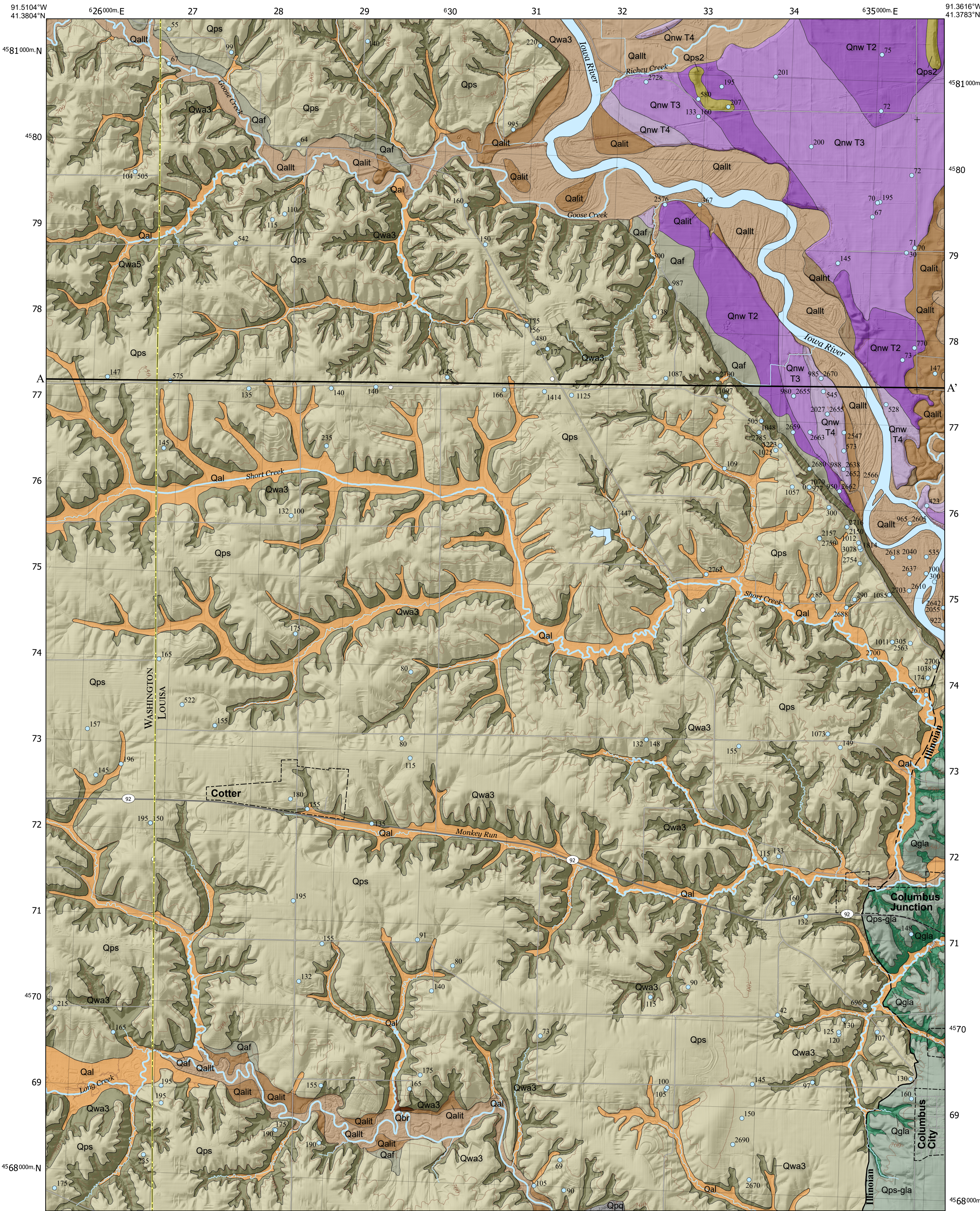


SURFICIAL GEOLOGIC MAP OF THE COTTER 7.5' QUADRANGLE, LOUISA AND WASHINGTON COUNTIES, IOWA

Stephanie Tassier-Surine, Phil Kerr, and Alyssa Bancroft
Iowa Geological Survey, IHHR-Hydroscience & Engineering, University of Iowa, Iowa City, Iowa



INTRODUCTION

The Cotter 7.5' Quadrangle is located in Louisa and Washington counties on the Southern Iowa Drift Plain landform region. The thickness of Quaternary materials varies widely across the quadrangle generally ranging from 0 to 23 m (0-75 ft) but may be up to 76 m (250 ft) in the eastern part of the mapping area. The region is dominated by loess-mantled till plains in the uplands, and coarse- to fine-grained alluvial deposits within the Iowa-Cedar river valley. Thick sequences of sand and gravel are mantled with fine-grained collian deposits. Limited areas of bedrock exposure are present in the southern portion of the map area.

Stratigraphically, the upland landscape is mantled with 2 to 5 m (7-15 ft) of Peoria Formation loess overlying paleosol formed in Pre-Illinoian glacial till of the Wolf Creek and Alburt formations. The Illinoian glacier did not advance very far into Iowa and the terminal position is mostly coincident with the Cedar River. A small area of Illinoian Episode glacial till is present in the southeast corner of the map. Glacial deposits are only exposed in drainages and steep sideslopes. Valley units consist of a sequence of Holocene and Wisconsin age terraces. Higher elevation Wisconsin terraces are composed of sand and gravel of the Noah Creek Formation and are mantled with varying thicknesses (2 to 5 m (7-15 ft)) of collian sand and loess. Wisconsin terraces are generally differentiated by elevation. Lower elevation Holocene terraces consist of finer grained alluvium and generally do not have an collian mantle.

Data collected for this mapping project included four drill cores totaling 152 feet in depth. Additional subsurface information was derived from the analysis of 190 water well records in the IGS' GeoSam database. An accompanying map of the Bedrock, Elevation and Quaternary Thickness has been published concurrently with this map (Open File Map OFM-25-9; Bancroft and Kerr, 2025).

DESCRIPTION OF MAP UNITS

- QUATERNARY SYSTEM**
- HUDSON EPISODE**
- Qal** **Qal - Alluvium (DeForest Formation-Undifferentiated)** Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous to calcareous, stratified silty clay loam, clay loam, loam to sandy loam alluvium and colluvium in stream valleys, on hill slopes, and in closed depressions. May overlie Pre-Illinoian or Illinoian glacial till, Peoria Formation loess, or Noah Creek Formation sand and gravel. Associated with low-relief modern floodplain, closed depressions, modern drainageways or topsoil positions on the landscape. Seasonal high water table and potential for frequent flooding.
 - Qallt** **Qallt - Low Terrace (DeForest Formation-Camp Creek and Roberts Creek members)** Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous, stratified silty clay loam, loam, or clay loam, associated with the modern channel belts of the Iowa and Cedar river valleys and their tributaries. Overlies Noah Creek Formation sand and gravel. Occupies the lowest position on the floodplain (i.e., modern channel belts). Seasonal high water table and frequent flooding potential.
 - Qalit** **Qalit - Intermediate Terrace (DeForest Formation-Camp Creek, Roberts Creek, and Gunder members)** Variable thickness of less than 1 to 5 m (2-16 ft) of very dark gray to brown, noncalcareous, stratified silty clay loam to loam that overlies the Noah Creek Formation. Occupies low terrace position above the modern floodplain in the Iowa and Cedar river valleys. Seasonal high water table and frequent flooding potential.
 - Qalht** **Qalht - High Terrace (DeForest Formation-Gunder Member)** Variable thickness of less than 1 to 7 m (3-22.5 ft) of very dark gray to brown, noncalcareous, silty clay loam, loam alluvium or colluvium. Overlies Noah Creek Formation. Occupies terrace and valley margin position 2 to 3 m (7-10 ft) above the modern floodplain in the Iowa and Cedar river valleys. Seasonal high water table and rare flooding potential.
 - Qaf** **Qaf - Alluvial fan (Corrington Mbr.)** Variable thickness of 2 to 5 m (7-16 ft) of dark brown to yellowish brown, noncalcareous, silt loam to loam with interbedded lenses of fine sand and silts. A pebble lag is commonly found at or near the fan surface. Overlies thick sand and gravel of the Noah Creek Formation. Steep angled fans occur at the base of low order drainages and colluvial slopes.
- WISCONSIN EPISODE**
- Qnw** **Qnw - Sand and Gravel (Noah Creek Formation)** Generally 3 m (10 ft) to greater than 15 m (49 ft) thick, but there may be significantly thinner coarse-grained deposits in smaller stream valleys. Yellowish brown to gray, poorly to well sorted, massive to well stratified, coarse to fine feldspathic quartz sand, pebbly sand, and gravel. In the map area the unit overlies Illinoian or Pre-Illinoian glacial deposits. This unit may be overlain by Holocene alluvium and is mantled with varying thicknesses of collian deposits. This unit encompasses outwash deposits that accumulated in valley trains during the Wisconsin Episode and consists of multiple terrace levels (Qnw T1, Qnw T2, Qnw T3, and Qnw T4) that have been identified in the Cedar River valley; the Qnw T1 terrace is not present in the map area. Only shown on the cross-section.
 - Qnw T4** **Qnw T4 - Eolian Mantled Outwash Terrace (Noah Creek Formation)** Generally 3 to 15 m (10-49 ft) of yellowish brown to gray, poorly to well sorted, massive to well stratified, coarse to fine feldspathic quartz sand, pebbly sand, and gravel. Intermittently mantled with 1 to 3 m (3-10 ft) of yellowish brown to gray, massive, jointed, calcareous or noncalcareous, silt loam and intercalated fine to medium, well sorted, sand- Peoria Formation collian deposits. This terrace lies 1 to 3 m (3-10 ft) above the modern channel. All Qnw units are combined on the cross-section and are only shown on the map.
 - Qnw T3** **Qnw T3 - Eolian Mantled Outwash Terrace (Noah Creek Formation)** Generally 3 to 15 m (10-49 ft) of yellowish brown to gray, poorly to well sorted, massive to well stratified, coarse to fine feldspathic quartz sand, pebbly sand, and gravel. Intermittently mantled with 1 to 3 m (3-10 ft) of yellowish brown to gray, massive, jointed, calcareous or noncalcareous, silt loam and intercalated fine to medium, well sorted, sand- Peoria Formation collian deposits. This terrace lies 2 to 3 m (7-10 ft) above the modern channel. All Qnw units are combined on the cross-section and are only shown on the map.
- ILLINOIS EPISODE**
- Qgla** **Qgla - Till (Glasford Formation)** Generally 3 to 15 m (10-50 ft) of very dense, massive, fractured, loamy glacial till of the Illinoian Glasford Formation with or without a thin loess mantle (Peoria Formation - less than 2 m) and intervening clayey Farmdale/Sangamon Geosol. Overlies the Yarmouth Paleosol formed in Pre-Illinoian till. This mapping unit encompasses narrowly dissected interfluvial and side slopes, as well as side valley slopes. Drainage is variable from well drained to poorly drained. Only shown on the cross-section.
- PRE-ILLINOIS EPISODE**
- Qwa3** **Qwa3 - Till (Wolf Creek or Alburt formations)** Over 50 m (164 ft) of very dense, massive, fractured, loamy glacial till of the Wolf Creek or Alburt formations. This unit is buried the Peoria and Glasford formations.
- OTHER MAPPING UNITS**
- Qpq** **Qpq - Pits and Quarries Sand and gravel pits and rock quarries.** Extent mapped as shown on the county soil survey and as identified on aerial imagery.
 - Qbr** **Qbr - Loamy Sediments Shallow to Dolostone, Limestone, Shale, and Sandstone (DeForest, Noah Creek, Peoria, Wolf Creek, and Alburt formations)** Generally 1 to 2 m (3-7 ft) of yellowish brown to gray, massive to weakly stratified, well to poorly sorted loamy, sandy, and silty sediments that overlie the Pennsylvanian or Mississippian bedrock surface.

CORRELATION OF MAP UNITS

General Lithology	Shallow Bedrock	Valley	Illinoian Till Plain	Pre-Illinoian Till Plain	Episode	Series	Stage
		Qallt	Qal	Qal		Hudson	Holocene
Alluvium		Qalit					
		Qaf					
Eolian	Qbr		Qps-gla	Qps			Quaternary
			Qps2				
Outwash		Qnw T4				Wisconsin	
		Qnw T3					
		Qnw T2					
		Qnw*					
Glacial Till			Qgla			Illinois	
				Qwa3		Pre-Illinois	

*Unit only shown on the cross-section

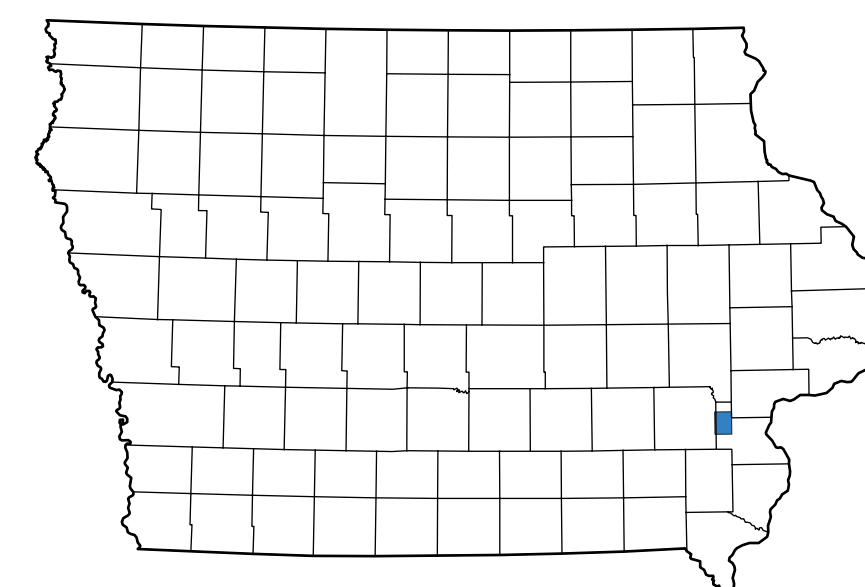


Figure 1. The location of the Cotter Quadrangle in Iowa.

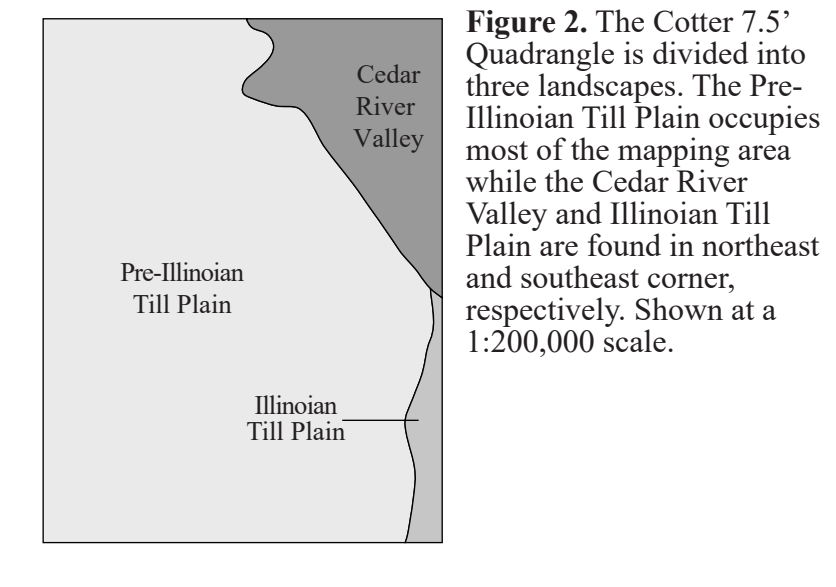


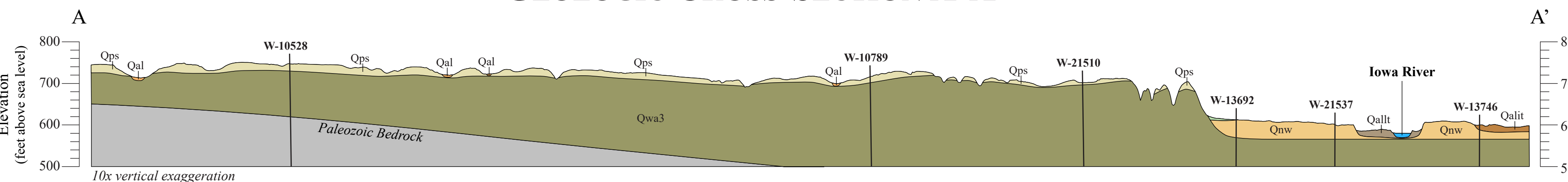
Figure 2. The Cotter 7.5' Quadrangle is divided into three landscapes. The Pre-Illinoian Till Plain occupies most of the mapping area while the Cedar River Valley and Illinoian Till Plain are found in northeast and southeast corner, respectively. Shown at a 1:200,000 scale.

ACKNOWLEDGEMENTS

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Geology based on fieldwork done by S. Tassier-Surine 2024-2025. Digital cartography by P. Kerr. Base map generated using data 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. Supported in part by the USGS Cooperative Agreement Number G24AC00332 from the USGS National Cooperative Geologic Mapping Program (NCG-MP) STATEMAP Program. Additional funding for student was provided by the National Science Foundation (NSF) Award #2119888 NSF IUSE-GEOPaIth, GP-GO: Iowa Environmental Internship Pathways Program).

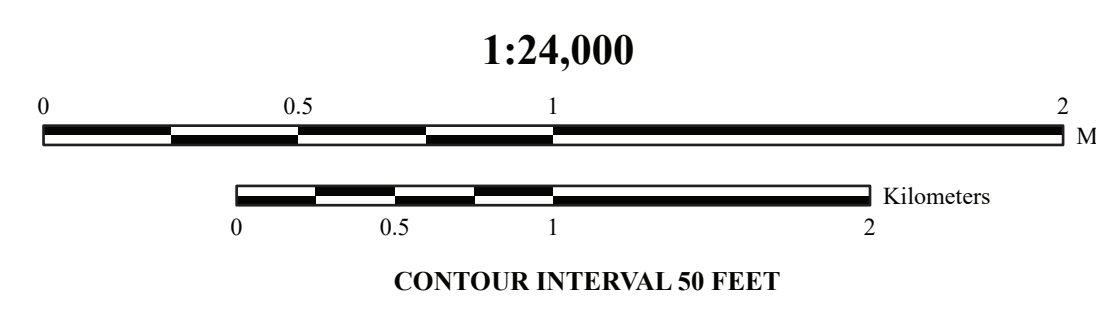
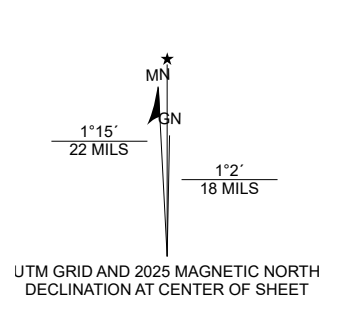
GEOLOGIC CROSS-SECTION A-A'



ADJOINING QUADRANGLES

1	2	3
4	5	
6	7	8

1 Riverside, IA
2 Lone Tree, IA
3 Nichols, IA
4 Ainsworth, IA
5 Columbus Junction, IA
6 Crawfordville, IA
7 Winfield North, IA
8 Cairo, IA



- MAP SYMBOLS**
- water well with total depth
 - stratigraphic core
 - unit contact
 - elevation contour
 - glacial margin, location certain
 - glacial margin, location inferred
 - cross-section
 - water body
 - stream
 - hillshade
- ROAD CLASSIFICATION**
- State Route
 - Local Road

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