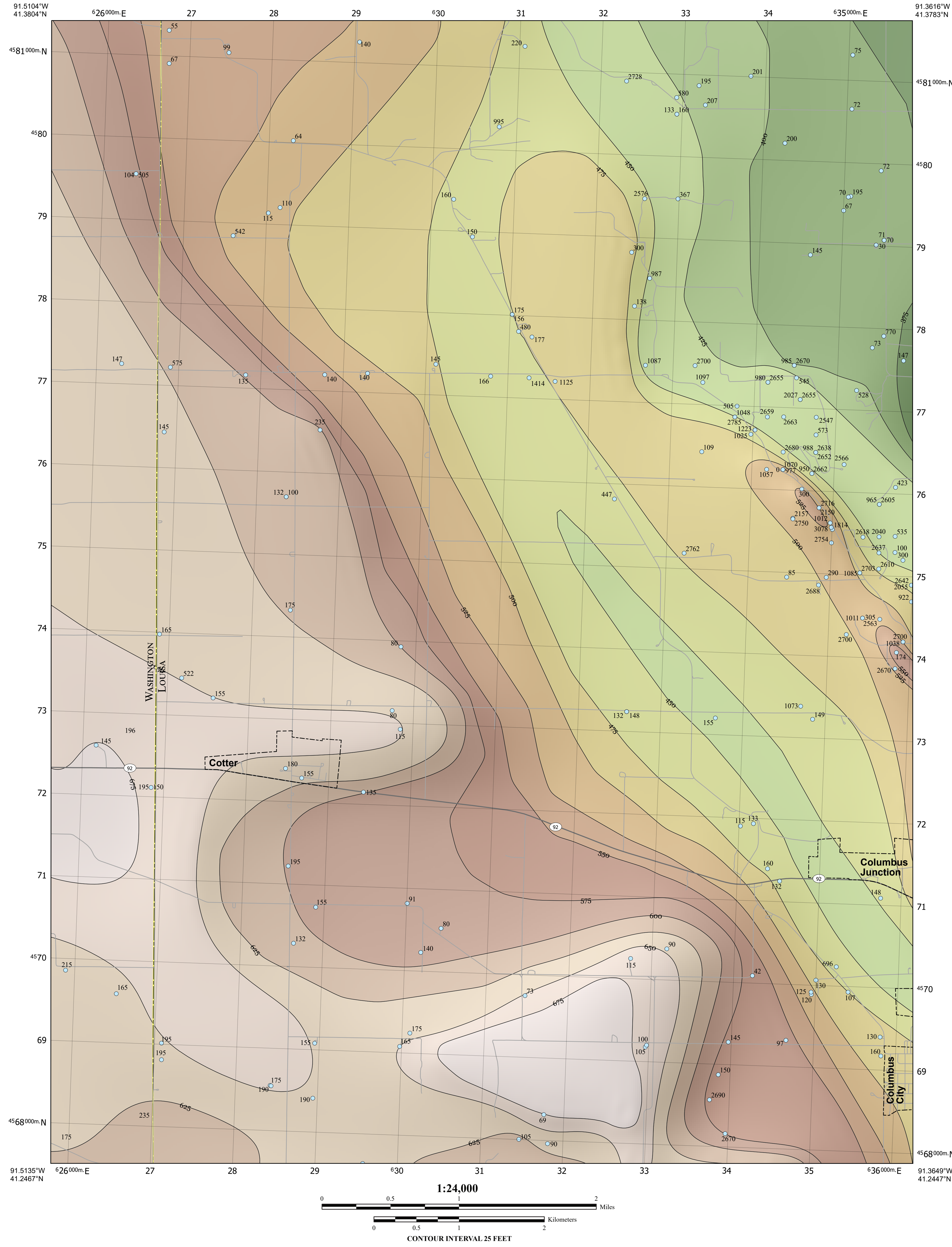
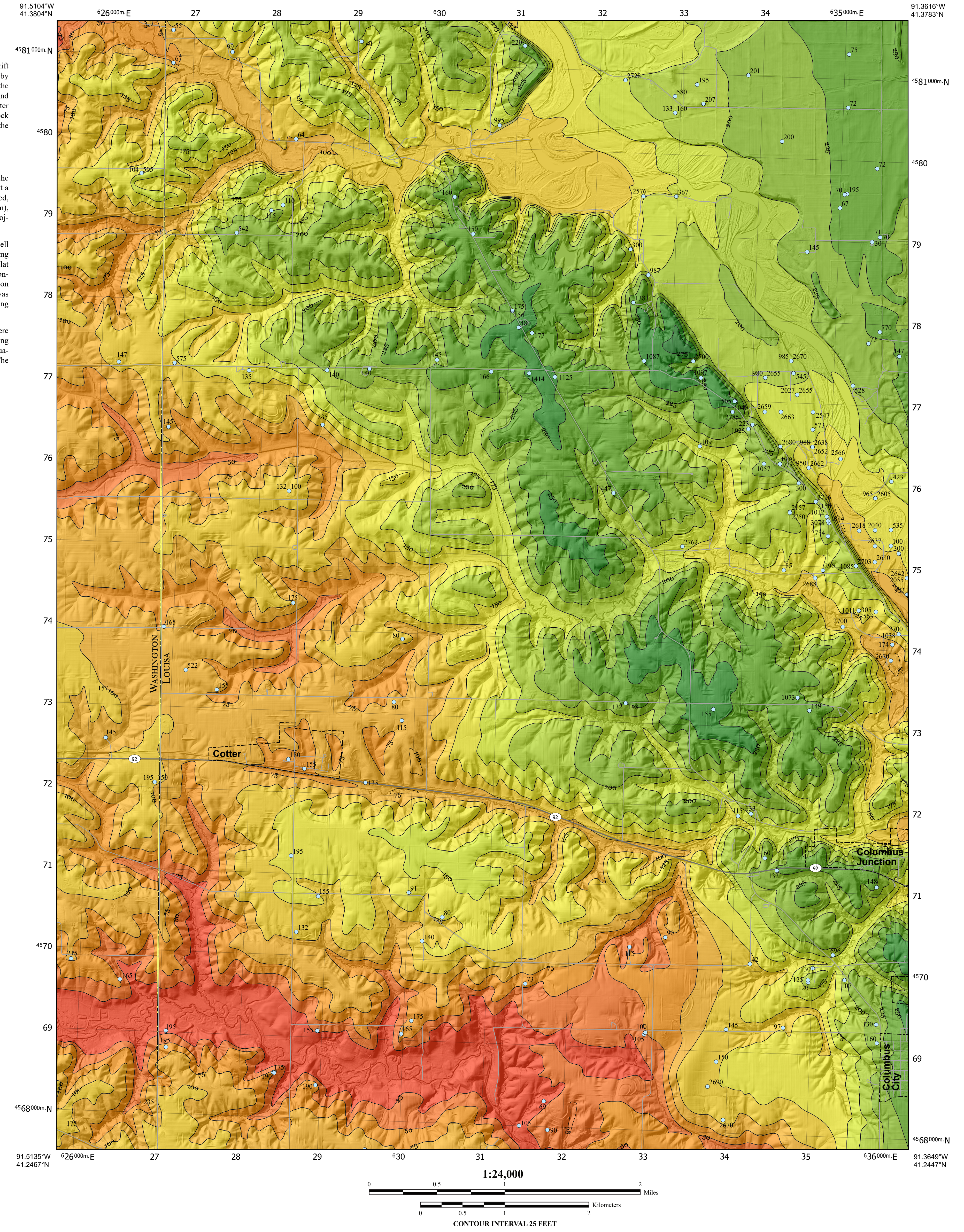


Alyssa Bancroft and Phil Kerr
Iowa Geological Survey, IIHR-Hydroscience & Engineering, University of Iowa, Iowa City, Iowa

BEDROCK ELEVATION



QUATERNARY THICKNESS



INTRODUCTION

The Cotter 7.5' Quadrangle in Louisa and Washington counties, Iowa is located within the Southern Iowa Drift Plain (SIDP) and Iowa-Cedar Lowland (ICL) landform regions. The SIDP is an area with a topography defined by loess-mantled uplands and slopes, whereas the ICL is a low-relief floodplain consisting of sediment deposited by the Cedar River. Like much of Iowa, the bedrock surface within the quadrangle is entirely concealed by glacial deposits and further information about the Quaternary geology in the area can be found on the Surficial Geologic Map of the Cotter 7.5' Quadrangle of Louisa County, Iowa (IGS Open File Map OFM-25-08). The boundary between Paleozoic bedrock and unconsolidated Quaternary deposits is likely just as irregular as the land surface itself, as a result, the thickness of the Quaternary varies widely across the quadrangle and ranges from 25 to 400 feet (7.5 to 122 m).

METHODOLOGY

The Bedrock Elevation and Quaternary Thickness Maps of the Cotter 7.5' Quadrangle were constructed using the same datasets as the Surficial Geologic Map (IGS Open File Map OFM-25-08) and the bedrock topography drawn at a 25-foot contour interval. Geologic information from Louisa and Muscatine counties and the surrounding area was used, and this includes drilling records housed in the Iowa Geological Survey (IGS) Geologic Sampling Database (GeoSam), existing maps and technical reports, Iowa Department of Transportation (IDOT) data, and reports from engineering projects and quarry operators.

More than 100 boring records from the IGS GeoSam Database, including both lithologic descriptions of well cutting samples (striplugs) and driller's logs, were evaluated for the Cotter 7.5' Quadrangle and the area surrounding the quadrangle. Each record was checked for locational accuracy using information from the driller's logs, historic plat books, county assessor information, and direct communication with landowners. The depth to the surficial-bedrock contact was determined for each well and assigned an elevation value by subtracting it from the surface digital elevation model (DEM). These data points provided the framework for the Bedrock Elevation Map. Additional information was gained from an assessment of the Natural Resources Conservation Service (NRCS) County Soil Survey by identifying soil series that indicate shallow bedrock.

To create the Bedrock Elevation Map, bedrock elevation contours (drawn at a 25-foot contour interval) were digitized manually onscreen using Esri ArcGIS Pro 3.0 software. The bedrock elevation raster was then generated using interpolations of the bedrock surface created with the "Topo to Raster" geoprocessing tool (ArcGIS Pro 3.0). The Quaternary Thickness Map was created by subtracting the bedrock elevation raster values from the surficial DEM raster. The resulting surface was rounded to the nearest integer and contours were generated from this result and then smoothed.

BEDROCK ELEVATION

>675
>650
>625
>600
>575
>550
>525
>500
>475
>450
>425
>400
>375
>350

feet above sea-level

QUATERNARY THICKNESS

≤25
≤50
≤75
≤100
≤125
≤150
≤175
≤200
≤225
≤250
≤275
≤300

feet below land surface

MAP SYMBOLS

- water wells with depth shown
- + passive seismic station
- topographic line
- ▨ hillshade

ROAD CLASSIFICATION

- State Route
- Local Road

ADJOINING QUADRANGLES

1	2	3
4	5	6
7	8	

- Riverside, IA
- Lose Tree, IA
- Nichols, IA
- Ainsworth, IA
- Columbus Junction, IA
- Crawfordsville, IA
- Winfield North, IA
- Cairo, IA

UTM GRID AND 2025 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

171° 22' MILS

1° 2' MILS

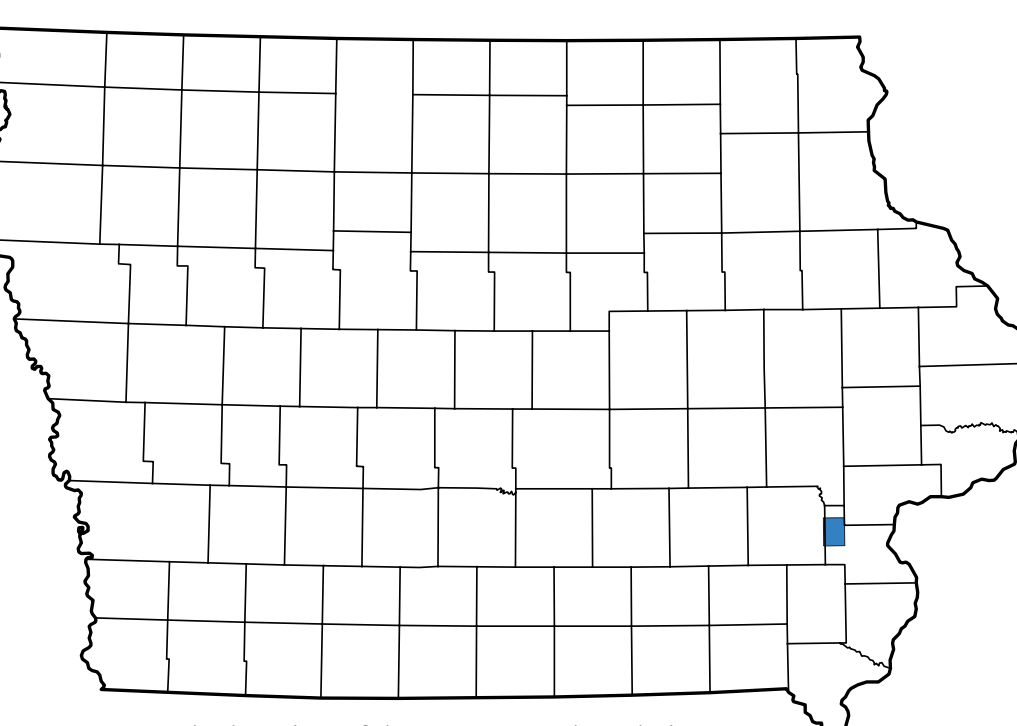


Figure 1. The location of the Cotter Quadrangle in Iowa.

ACKNOWLEDGEMENTS

Special thanks to the landowners who allowed access to their properties: Jacob Ewart (Louisa County Conservation Board Director), Eric Roberts, and Rose Thomann. Drilling was provided by Matthew Streeter and Tom Stoffler of the Iowa Geological Survey (IGS). Thanks to Rick Langel (IGS) for managing the IGS geologic sampling database (GeoSam). Joseph Honings (IGS) collected and processed Tromino HVSR passive seismic data. Valerie Diaz-Gibertini (IGS) processed geologic samples for grain-size analysis. University of Iowa Department of Earth and Environmental Sciences student Gabriela (Gabby) Garcia updated well locations in the IGS GeoSam database. Administrative support was provided by Suzanne Doerschak, Melissa Eckrich, Teresa Gaffey, Lisa Ringen, and Rosemary Tiwari.

Geology based on bedrock data by S. Tassier-Saint 2024-2025. Digital cartography by P. Kerr. Base map generated using data from the Iowa Geological Survey (IGS) StateMap Program. Map projection and coordinate systems 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 (NCGMP) STATEMAP Program. Additional funding for students was provided by the National Science Foundation (NSF) Award ECI19088 NSR IUSSE-GEOPROBIS, GEP-IGS, Iowa Environmental Interagency Pathways Program.