Bedrock Geology of South-Central Iowa

DIGITAL GEOLOGIC MAP OF IOWA
PHASE 4: SOUTH-CENTRAL IOWA

prepared by

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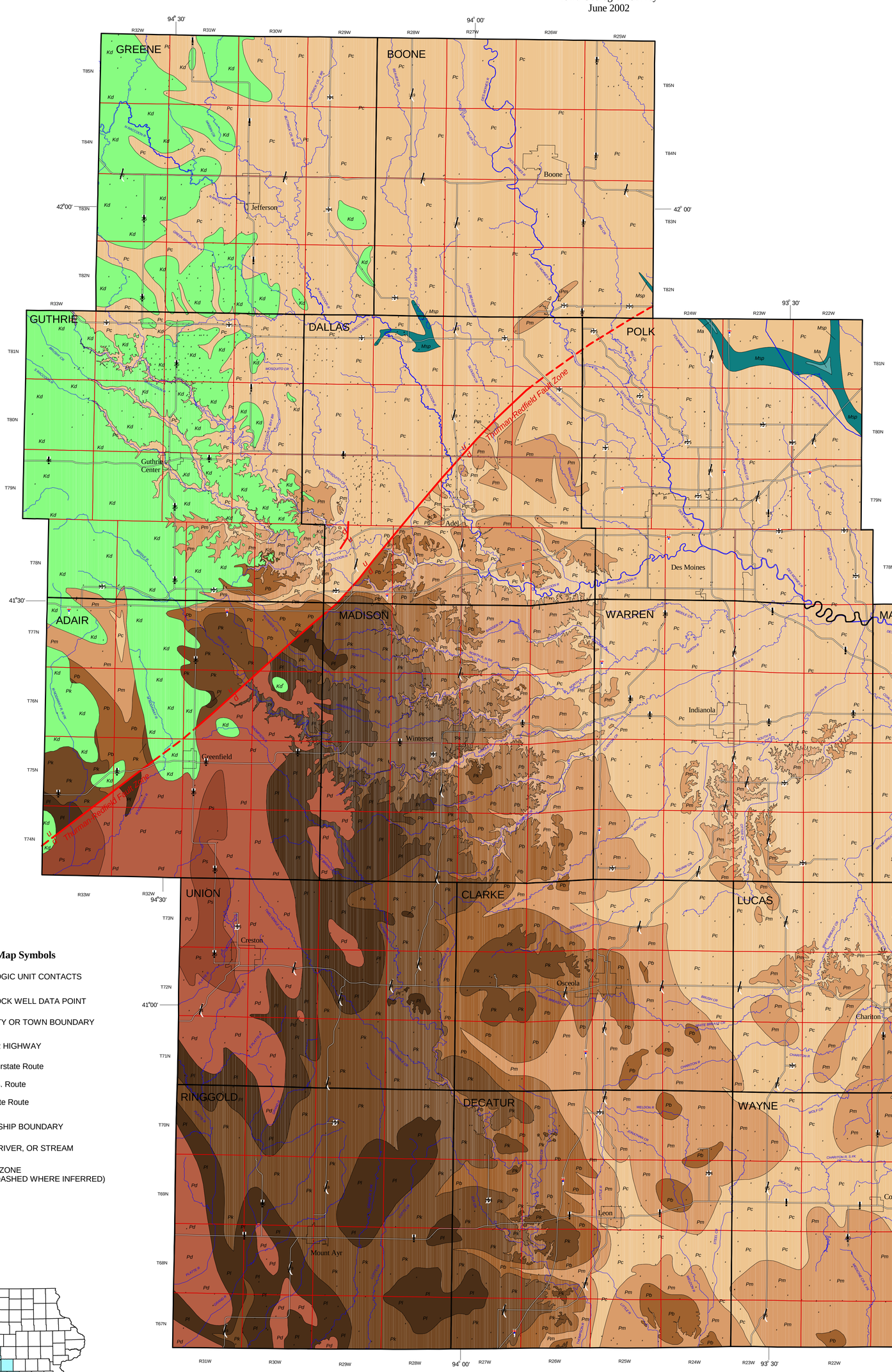
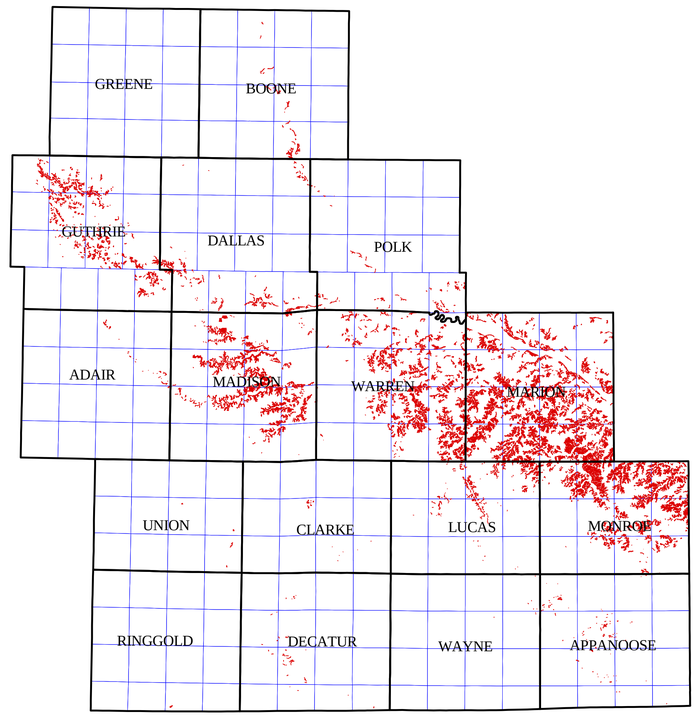


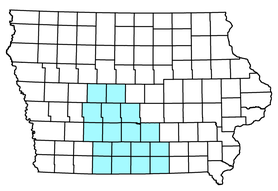
Rock Exposures in the Study Area

Areas of bedrock exposure or bedrock surface within soil horizon



Description of Map Symbols

- GEOLOGIC UNIT CONTACTS
- BEDROCK WELL DATA POINT
- COUNTY OR TOWN BOUNDARY
- MAJOR HIGHWAY
  - Interstate Route
  - U.S. Route
  - State Route
- TOWNSHIP BOUNDARY
- LAKE, RIVER, OR STREAM
- FAULT ZONE (DASHED WHERE INFERRED)



Index Showing Area of Geologic Map

0 5 10 15 20 25 Miles
0 5 10 15 20 25 30 35 40 Kilometers

scale 1:250,000
when printed at 36" x 42" format

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Open File Map 02-1

LEGEND

Descriptions of Rock Units

CRETACEOUS

Kd — **Dakota Formation:** Cretaceous (upper Albian and / or Cenomanian). Maximum thickness 150 feet (46 m) across northwestern map area in Greene, Guthrie, and Adair counties. Primary lithologies: sandstone, very fine- to coarse-grained, part pebbly to conglomeratic, part cemented by iron oxides; mudstone pale to medium gray, black (carbonaceous), red and pink. Secondary lithologies: chert residuum/gravel, siderite pellets in mudstones.

PENNSYLVANIAN

Ps — **Shawnee Group:** (middle Virgilian) upper Upper Pennsylvanian. Max thickness: 180 ft. (55 m) in Adair County. Primary lithologies: limestone, fossiliferous; shale, light-dk gray. Secondary lithologies: mudstone, light-dk gray. Minor: shale, black, phosphatic; mudstone, red; coal.

Pd — **Douglas Group:** (latest Missourian-early Virgilian) lower Upper and upper Upper Pennsylvanian. Max thickness: 116 ft. (35 m) in Union County. Primary lithologies: shale, light-dk gray; siltstone. Secondary lithologies: limestone, fossiliferous; mudstone, light-dk gray. Minor: shale, black, phosphatic; mudstone, red; coal.

Pl — **Lansing Group:** (late Missourian) lower Upper Pennsylvanian. Max thickness: 78 ft. (24 m) in Union County. Primary lithologies: shale, light-dk gray; limestone, fossiliferous. Secondary lithologies: shale, black, phosphatic; mudstone, light-dk gray, red. Minor: siltstone.

Pk — **Kansas City Group:** (middle Missourian) lower Upper Pennsylvanian. Max thickness: 125 ft. (38 m) in Ringgold County. Primary lithologies: shale, light-dk gray; limestone, fossiliferous. Secondary lithologies: shale, black, phosphatic; mudstone, gray-green to light gray. Minor: mudstone, red; coal.

Pb — **Bronson Group:** (early Missourian-latest Desmoinesian) lower Upper and uppermost Middle Pennsylvanian. Max thickness: 110 ft. (34 m) in Madison County. Primary lithologies: shale, light-dk gray; limestone, fossiliferous. Secondary lithologies: shale, black, phosphatic; mudstone, gray-green to light gray. Minor: siltstone; sandstone, f-m; coal; mudstone, red.

Pm — **Marmaton Group:** (late Desmoinesian) upper Middle Pennsylvanian. Max thickness: 155 ft. (48 m) in Madison County. Primary lithologies: shale, light-dk gray; limestone, fossiliferous. Secondary lithologies: mudstone, light gray to red; sandstone, f-m; shale, black, phosphatic. Minor: siltstone; coal; conglomerate; pyrite.

Pc — **Cherokee Group:** lower Middle Pennsylvanian (Atokan-Desmoinesian). Maximum thickness: 462 ft. (141 m) in Marion County. Primary lithologies: shale, light-dk gray, part silty, part sandy; sandstone vf-m. Secondary lithologies: shale, black, carbonaceous, part phosphatic; coal; mudstone, light gray to red. Minor: limestone, fossiliferous; sandstone, coarse; conglomerate, sandstone/siltstone/limestone clasts; siderite, pellets and concretions; pyrite.

MISSISSIPPIAN

Msp — **"St. Louis" and Pella fms.:** Middle Mississippian (Meramecian). Maximum thickness 150 ft (45 m); beveled to truncated beneath sub-Pennsylvanian unconformity. Primary lithologies: dolomite, part sandy; limestone, part sandy to fossiliferous; sandstone; green-gray shale, calcareous. Secondary lithologies: gypsum/anhydrite; limestone/dolomite breccia; oolitic limestone. Minor: chert, chalcedony.

Ma — **Augusta Group:** Includes Burlington, Keokuk, Warsaw fms.; Middle Mississippian (Osagean). Maximum thickness 190 ft (58 m); locally beveled beneath sub-"St. Louis" and sub-Pennsylvanian unconformities. Primary lithologies: dolomite, part argillaceous; dolomitic limestone. Secondary lithologies: limestone, crinoidal packstone; green-gray shale; glauconitic dolomite; chert, nodular to bedded. Minor: chalcedony, quartz geodes.