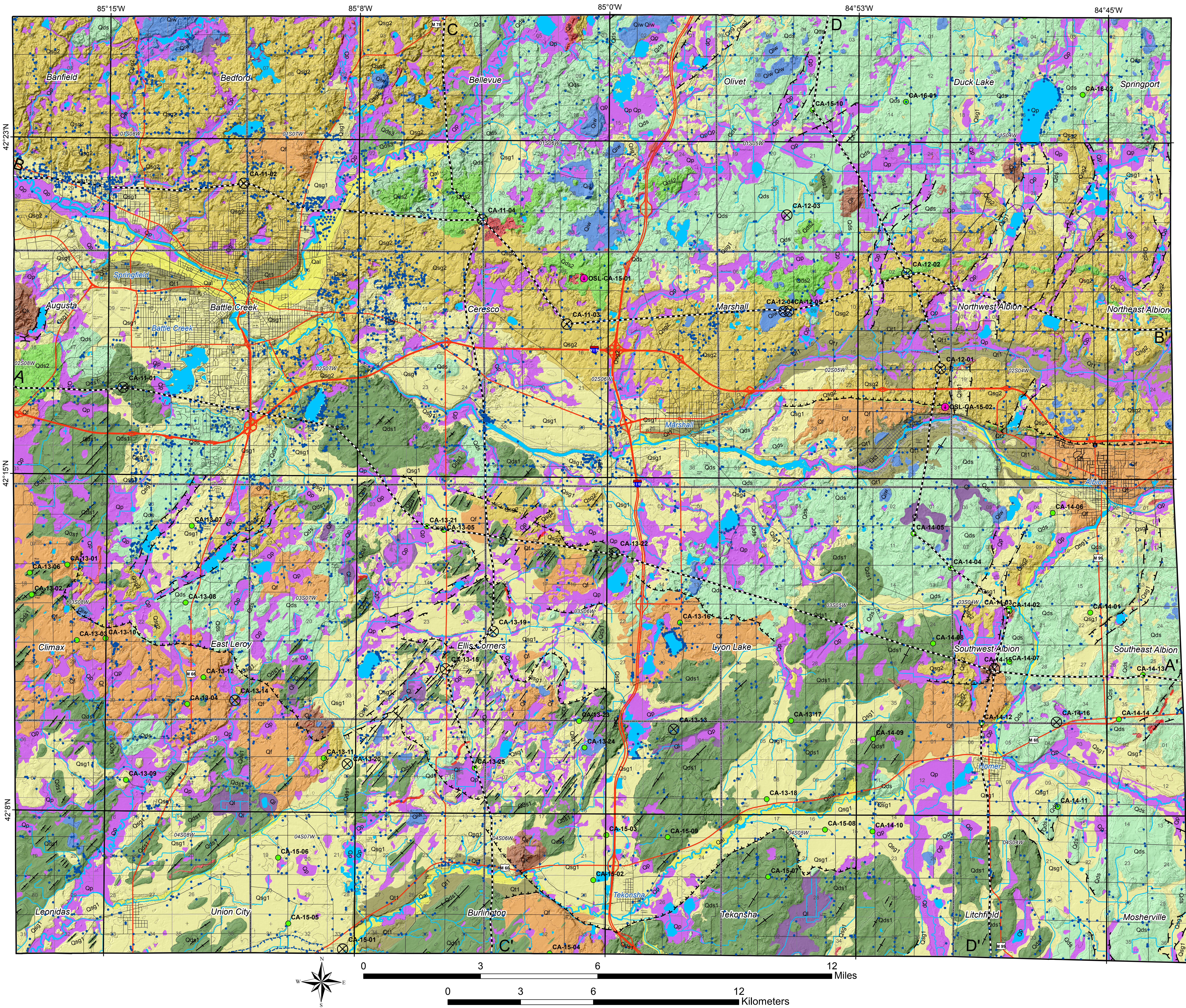
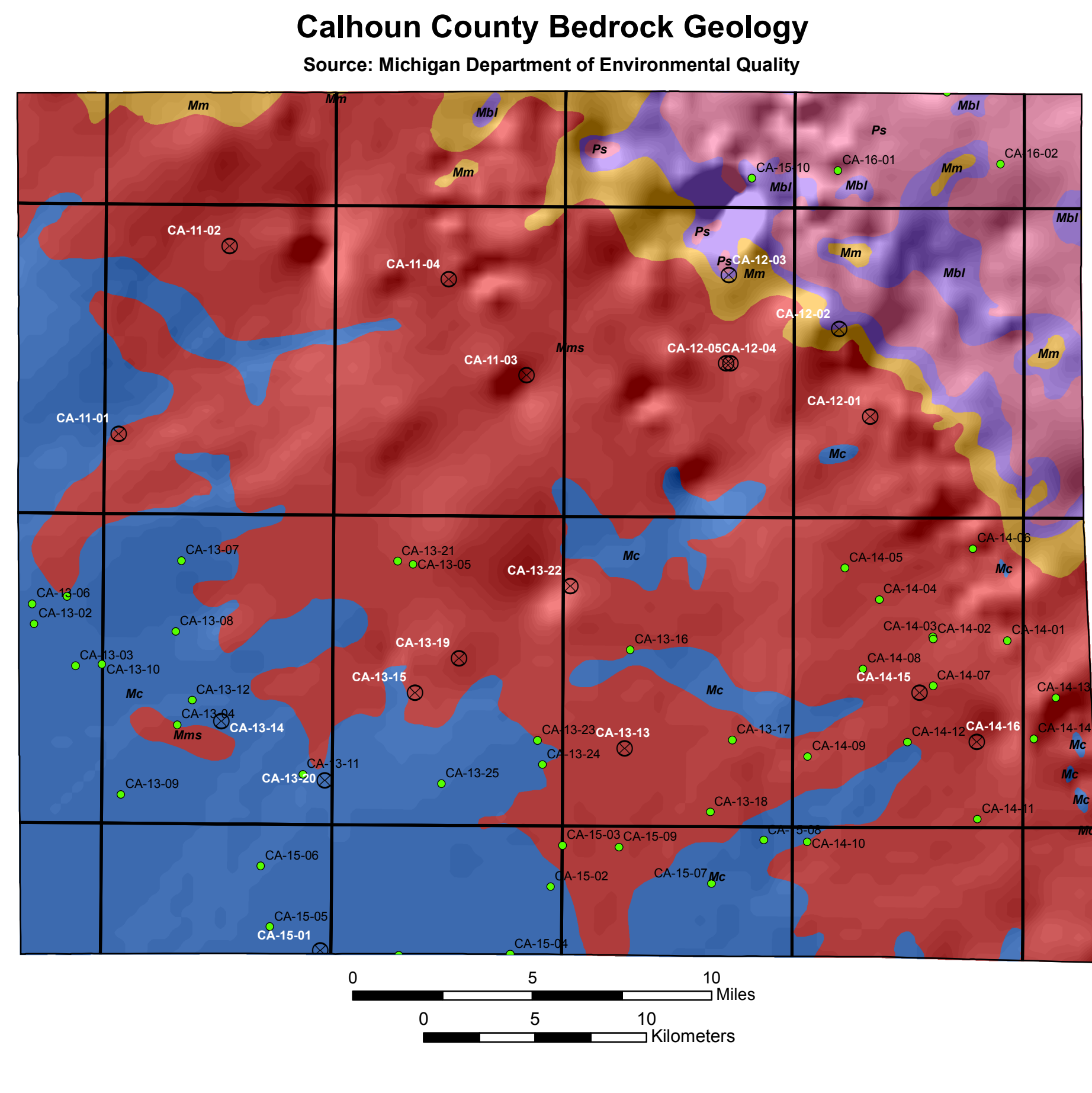
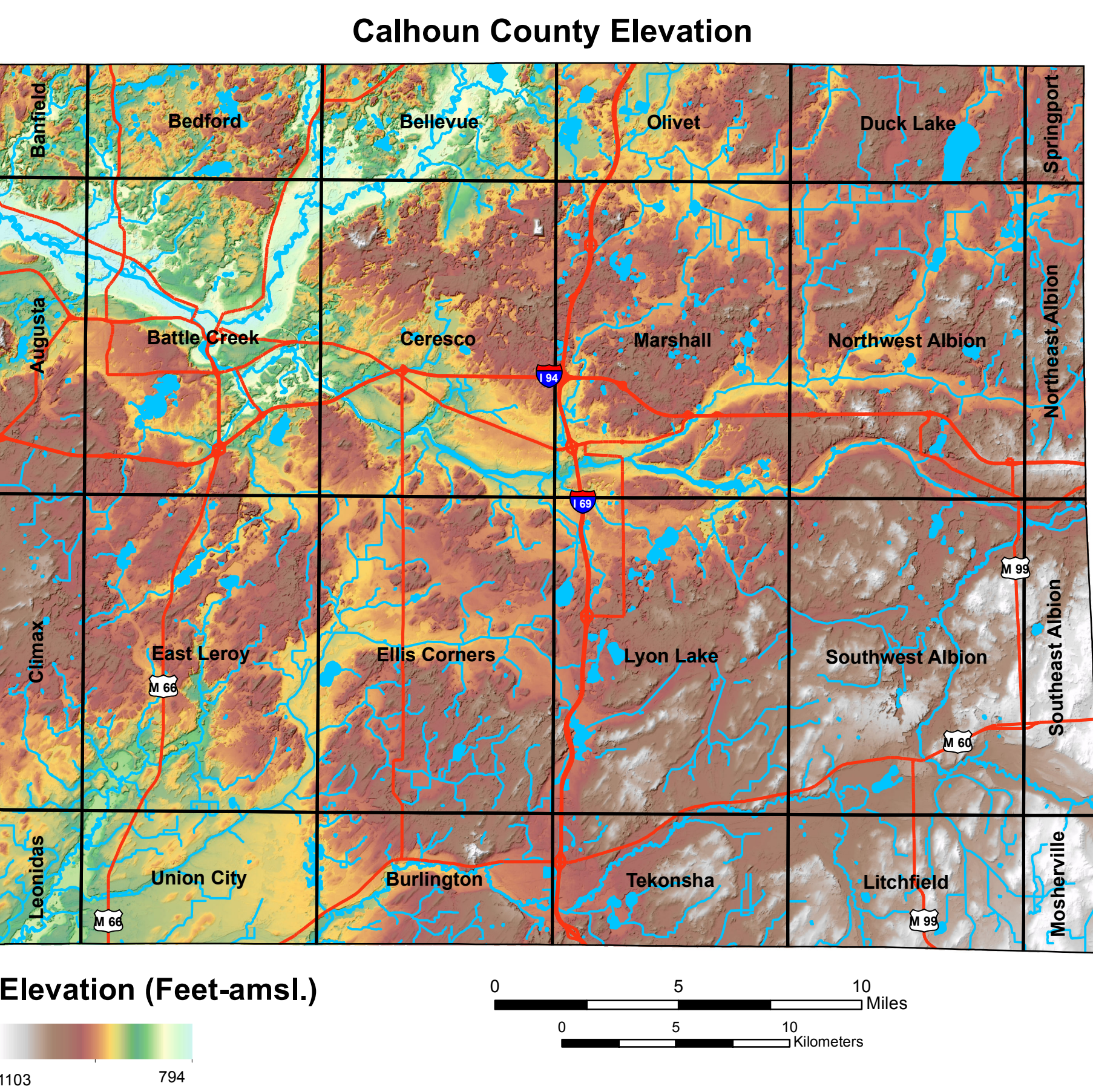
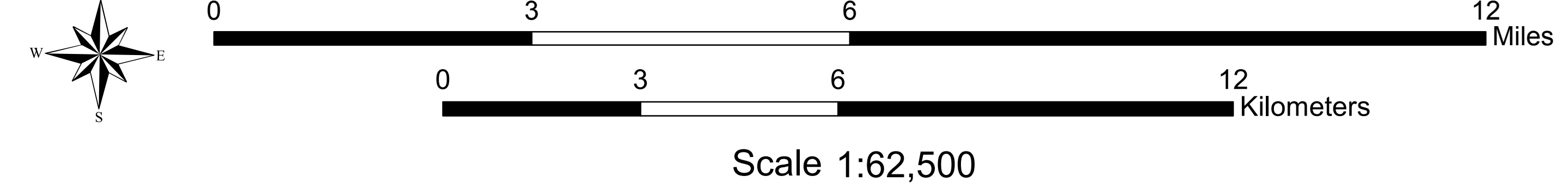


# Surficial Geology of Calhoun County, Michigan

Michigan Geological Survey, Western Michigan University, 2017  
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- ### Description of Map Units
- Quaternary**
- Qp** Peat and Muck. Isolated, poorly drained depressions or floodplain of Kalamazoo River valley. Age of material is Holocene. May be underlain by bedded sand and gravel or bedded silt and clay.
  - Qal** Alluvium. Consists of bedded sand and gravel to bedded silt and clay. Age of near surface sediment is Holocene. May be underlain by Pleistocene alluvium. Fluvial sediment in modern floodplains deposited by the Kalamazoo River, Battle Creek, and their tributaries.
  - Pits** Gravel and sand pits
  - Qds** Diamiction. Non-stratified, compact, material (till) composed of clay to sand matrix with clasts ranging from pebble to boulder size. Saginaw Lobe. May be overlain in places by bedded sand and gravel or bedded silt and clay. Small areas may not have diamiction present.
  - Qds1** Diamiction. Non-stratified, compact, diamiction (till) composed of clay to sand matrix with clasts ranging from pebble to boulder size. Saginaw Lobe. May be overlain in places by bedded sand and gravel or bedded silt and clay. Surface characterized by linear ridges oriented NE-SW (drumlins). Swales between drumlins may contain bedded sand and gravel or silt and clay.
  - Qds2** Ice-Marginal Position. Ridges or upland associated with ice-marginal position. High-relief hummocky topography.
  - Qds3** Diamiction Over Sandstone Bedrock. Non-stratified, compact, material (till) composed of clay to sand matrix with clasts ranging from pebble to boulder size overlying shallow sandstone bedrock. Saginaw Lobe. Small areas may not have diamiction present.
  - Qe** Esker. Linear to sinuous ridge composed of sand and gravel. Deposited in tunnel at base of ice or in ice-walled channel during deglaciation.
  - Qf** Fan. Outwash deposited in sloping fan-shaped landform emanating from ice-marginal position or portal of tunnel valley. Characteristics similar to Qsg1.
  - Qk** Kame. Conical hill underlain by bedded, deformed sand and gravel. May also contain diamiction and silt and clay. Mapped areas of Qk are located near former ice margin at portal of tunnel valley.
  - Qiw** Ice-walled Lake Plain. Flat-topped hill within area interpreted as marginal ice stagnation deposits. Surficial deposits may consist of sand and gravel or bedded silt and clay. Finer sediments contain tundra plant fragments and invertebrate fossils.
  - Ql** Glaciolacustrine Deposits. Depression on ice-marginal deposits underlain by bedded sand and silt. May contain bedded silt and clay at depth. May have initially developed on debris covered, stagnant ice.
  - Qsg1** Outwash. Bedded sand and gravel, undifferentiated; lacks kettles and collapse features. May contain small areas of Qds. Transition to Qal along rivers. May also contain slopewash/colluvium at base of steep slopes.
  - Qsg2** Outwash. Bedded sand and gravel with hummocky and/or pitted surface formed by collapse of buried ice blocks. Deposition on surface of variable thickness of stagnant ice. May contain areas of Qds, which is usually sandy and non-compact. Surface mantled with large boulders.
  - Qt1** Terrace Deposit. Flat to gently sloping surface adjacent to Kalamazoo River, Rice Creek, St. Joseph River, and Coldwater River. Highest terrace along a particular reach of the stream where multiple terraces are present. Underlain by bedded sand and gravel of Pleistocene age.
  - Qt2** Terrace Deposit. Flat to gently sloping surface adjacent to Kalamazoo River, Rice Creek, St. Joseph River, and Coldwater River. Underlain by bedded sand and gravel of Pleistocene age. Lower elevation than Qt1.
  - Qt3** Terrace Deposit. Flat to gently sloping surface adjacent to Kalamazoo River, Rice Creek, St. Joseph River, and Coldwater River. Underlain by bedded sand and gravel of Pleistocene age. Lower elevation than Qt2.
- Pennsylvanian**
- Pp** Parma Sandstone. Sandstone bedrock outcrop and thin drift areas. Fine-medium grained sandstone.
- Mississippian**
- Mms** Marshall Sandstone. Bedrock outcrop and thin drift. Fine-medium grained sandstone.



Geology based on field work by Alan E. Kehew, John M. Esch and John S. Linker. Map compilation and digital cartography by Sita Karki, Michigan Geological Survey, Western Michigan University. This map is based on a compilation of USGS 7.5 Minute Quadrangles. All map data reprojected to Michigan GeoRef, North American Datum of 1983 (NAD 83).

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- ### Legend
- Wellclog Water Wells
  - Geoprobe Boring Locations
  - Rotosonic Boring Locations
  - OSL Locations
  - Highways
  - Roads
  - Ice Marginal Position
  - Tunnel Valley
  - Meltwater Sluiceway
  - USGS 7.5 Minute Topographic Quadrangles
  - Sections
  - Township and Range
  - Streams
  - Lakes
  - Contours
  - Crest Of Drumlin
  - Cross Section Lines

