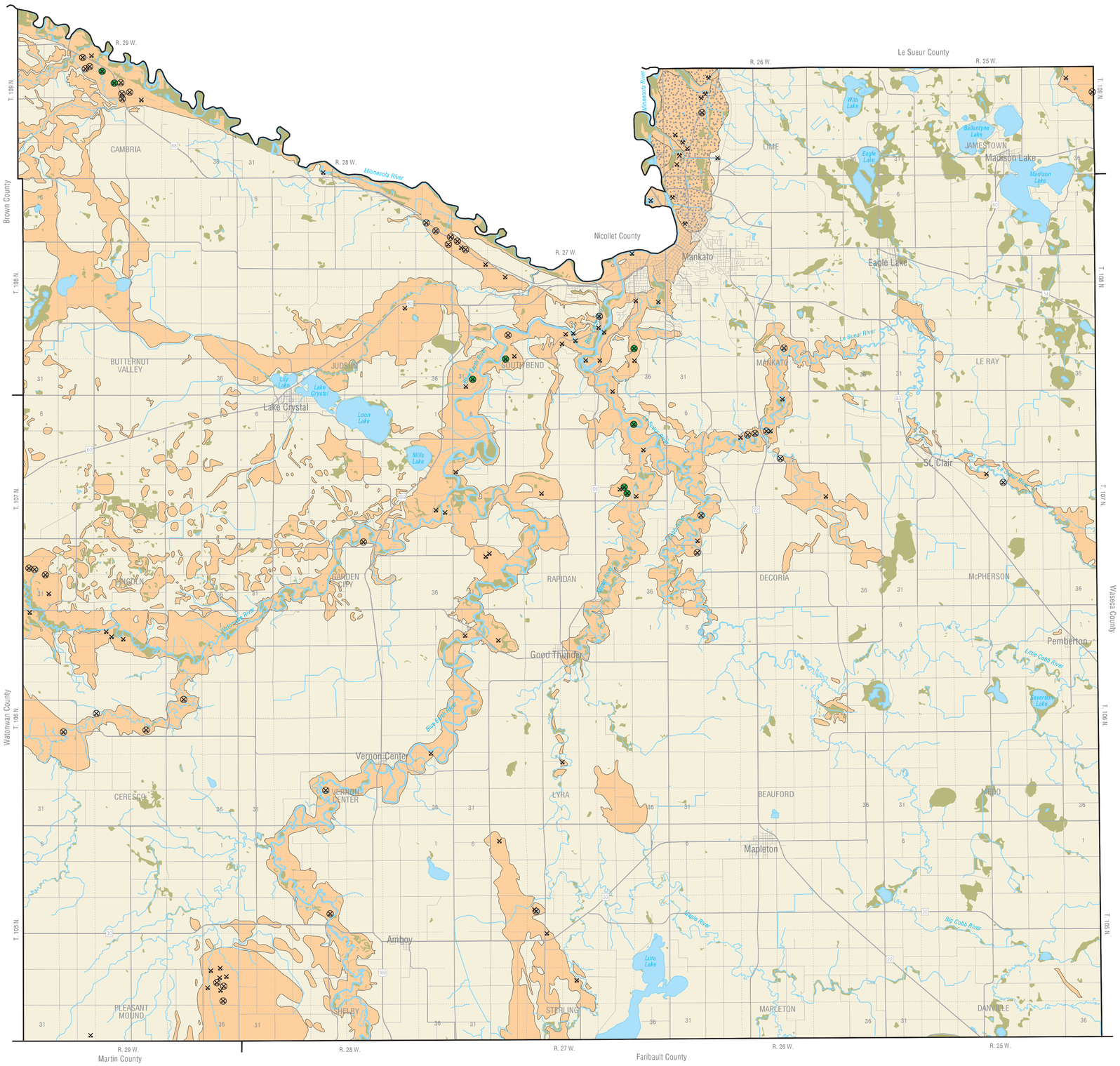
Minnesota Department of Natural Resources
Division of Minerals
William C. Brice, Director

AGGREGATE RESOURCES SIGNIFICANT DEPOSITS* BLUE EARTH COUNTY, MINNESOTA

JONATHAN B. ELLINGSON

1999



Scale 1:100,000

0 1 2 3 4 Miles
0 1 2 3 4 5 6 Kilometers

(Aggregate resource mapping units were delineated at 1:50,000)

AGGREGATE POTENTIAL: For the purpose of this study, aggregate potential is defined as an assessment of the relative probability that an aggregate deposit exists within a given area, with almost all emphasis placed upon geologic evidence, parameters, and interpretation at the reconnaissance level, rather than upon economic feasibility evaluation or other parameters. This assessment does not imply that everywhere within a given map unit designated as "Potential Aggregate Resources" there exists economic aggregate deposits. Rather, that within such a map unit, geologic processes were active that could have created aggregate deposits at specific sites. Geologic measurements of aggregate deposits remain constant, but economic criteria and environmental permitting vary across time and place. Important site-specific factors such as ownership, zoning, protected waters and wetlands, environmental permitting and impacts, distance to markets, royalties, and individual site characteristics, such as access, all contribute to the final "potential" of a specific parcel, however, these factors were not included in this study.

POTENTIAL SAND AND GRAVEL RESOURCES: Those geologic units that are inferred to contain moderately and highly desirable sand and gravel deposits. These units exhibit the geologic characteristics that typically produce sand and gravel deposits. Existing gravel pits and MN/DOT aggregate sources lying within these units indicate identified or known resources. The geologic units having potential for sand and gravel include terrace, alluvial, delta, beach, flood plain, outwash channel, and ice contact (esker and kame) features; these units typically contain sorted sand and gravel with little silt or clay.

POTENTIAL CRUSHED STONE RESOURCES: Those bedrock formations that consist of moderately desirable limestone (dolomitic limestone) that is suitable for crushing. These units are inferred to be relatively thick (>50 feet) with overburden thicknesses of less than 10 feet. Quarries located within these units indicate identified or known resources. These bedrock resources are typically exposed as large benches along the Minnesota River where alluvial processes have eroded away the overlying glacial material. Thin sand and gravel deposits are commonly found overlying these units.

LIMITED POTENTIAL FOR AGGREGATE RESOURCES: Those units that generally have less desirable, little, or no potential for aggregate resources. These units exhibit geologic characteristics that are typically not consistent with significant aggregate deposits. The geologic units having limited potential include lake plains, moraines, and small alluvial deposits; these units typically contain clay, silt, fine sand, unsorted sediments (till), or very thin layers of sand and gravel. These units may include aggregate deposits that are too small to be mapped.

IDENTIFIED AGGREGATE RESOURCES: Those areas where aggregate resources (sand, gravel, and/or crushed stone) have been or are currently being mined. Pit and quarry locations have been gathered from several different sources, including topographic maps, aerial photographs, county records, county highway department maps, soil surveys, MN/DOT files, fieldwork, gravel operators, and other miscellaneous sources. The pits and quarries range in size from less than 1 acre to greater than 50 acres and may be active, inactive, depleted, or reclaimed. The aggregate quality of the pits varies.

- **Gravel Pits:** Locations were gathered from several sources. Any given pit may be active, inactive, depleted, or reclaimed.
- **Gravel Pits - MN/DOT files:** Minnesota Department of Transportation's Aggregate Source Information System listing of aggregate sources. Test hole logs, sieve, and quality test data are available. Green symbols indicate test pits that meet MN/DOT aggregate specifications for deleterious materials for concrete and asphalt.
- **Quarries:** Limestone quarries from several sources. Any given unit may be active, inactive, depleted, or reclaimed.

WETLANDS: Wetland area.

WATER: Lakes or rivers.

*Significant aggregate deposits are defined as those deposits most likely to be explored and evaluated for future commercial use; they include moderately and highly desirable sand, gravel, and crushed stone deposits.

Base map data sources:
Lakes, wetlands, and major rivers from National Wetland Inventory, U.S. Fish and Wildlife Service, compiled at 1:24,000 from aerial photography (1979-1988) and spot field checked. Minor rivers from State of Minnesota Basemap, 1996, Department of Transportation Surveying and Mapping BaseMap Development Group.
Public Land Survey - PLS Project, 1999, Minnesota Department of Natural Resources, Division of Minerals.
Roads from State of Minnesota Basemap, 1996, Department of Transportation Surveying and Mapping BaseMap Development Group.

Aggregate Resources:
Aerial photograph interpretation, field work, and delineation of mapping units by Jonathan B. Ellingson, 1998-1999, County Aggregate Mapping Program, Division of Minerals, Minnesota Department of Natural Resources. Source information included aerial photographs from NAPP (National Aerial Photography Program), 1991-1992, 9"x 9" color infrared photos at 1:40,000; DOQs (Digital Orthophoto Quadrangles) at 1:12,000 from USGS (United States Geological Survey); DRGs (Digital Raster Graphics) at 1:24,000 from USGS; 7.5-minute USGS topographic quadrangles at 1:24,000; and Soil Survey of Blue Earth County from USDA-SCS (United States Department of Agriculture - Soil Conservation Service), 1978.

GIS database design and cartography by Renee Johnson (1999). Digitizing by Jeff Nyquist (1999).

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Projects are determined by a committee composed of Governor-appointed members from the public and private sectors.

Plate I, Report 335, Aggregate Resources, Significant Deposits.
Plate II, Report 335, Aggregate Resources.
Plate III, Report 335, Surficial Geology.
Plate IV, Report 335, Data Sources and Mapping Methodology.