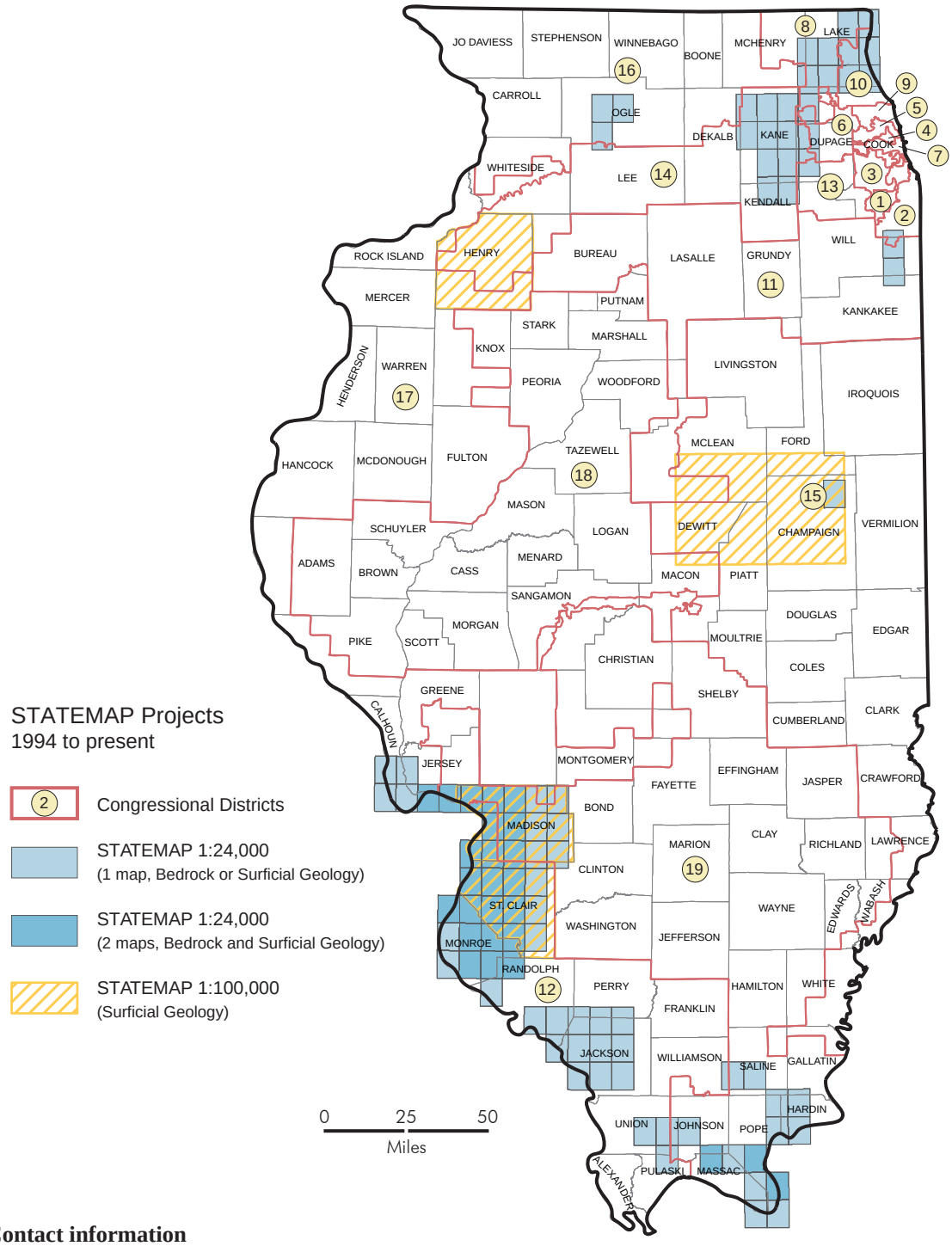
Association of American State Geologists

United States Geological Survey

National Cooperative Geologic Mapping Program

STATEMAP Component: States compete for federal matching funds for geologic mapping

ILLINOIS



STATEMAP Projects
1994 to present

- 2 — Congressional Districts
- STATEMAP 1:24,000 (1 map, Bedrock or Surficial Geology)
- STATEMAP 1:24,000 (2 maps, Bedrock and Surficial Geology)
- STATEMAP 1:100,000 (Surficial Geology)

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SUMMARY OF STATEMAP
GEOLOGIC MAPPING PROGRAM IN ILLINOIS

FFY	7.5' Quadrangles Mapped	Federal Dollars	State Dollars	Total Project Dollars
1993	Champaign (30' x 60') & Mermet Surficial Geology Mermet & Reevesville Geology	$72,395	$126,768	$199,163
1994	Elburn & Geneva Surficial Geology Anna & Mt. Pleasant Bedrock Geology	80,000	128,270	208,270
1995	Brownfield, Smithland, Paducah E., & Little Cypress Surficial Geology Brownfield, Paducah NE, & Smithland Bedrock Geology	34,999	69,581	104,580
1996	Henry (County), Sugar Grove, Aurora N, Alton, & Grafton Surficial Geology Alton & Grafton Bedrock Geology	108,921	109,409	218,330
1997	Pingree Grove, Elgin, Elsah, & O'Fallon Surficial Geology Elsah & O'Fallon Bedrock Geology	100,000	100,000	200,000
1998	Hampshire, Maple Park, Cahokia, French Village, & Millstadt Surficial Geology Cahokia, French Village, & Millstadt Bedrock Geology	153,827	263,853	417,680
1999	Beecher W, Steger, Columbia, Waterloo, & Renault Surficial Geology Columbia, Waterloo, & Renault Bedrock Geology	119,856	196,036	315,892
2000	Wadsworth, Wood River, Monks Mound, Granite City, & Collinsville Surficial Geology Wood River, Monks Mound, & Collinsville Bedrock Geology	138,935	139,176	278,111
2001	Wauconda Surficial Geology Valmeyer, Selma, Paderborn, & Ames Bedrock Geology	184,036	184,512	368,548
2002	Bethalto &Prairietown; Edwardsville, & Oakville Surficial Geology Bethalto, Prairietown, Edwardsville, Oakville, & Granite City Bedrock Geology	150,000	150,249	300,249
2003	Grayslake, Marine, St. Jacob, Worden Surficial Geology New Athens West & Red Bud Geology; Prairie du Rocher & Vienna Bedrock Geology	201,980	203,037	405,017
2004	Highland, Grantfork, Libertyville, & New Douglas Surficial Geology Freeburg, Ava, Oraville, Raddle, Rockwood, & Willisville Bedrock Geology	217,273	217,273	434,546
2005	Lake Zurich, Lebanon, Mascoutah, & Madison (County) Surficial Geology Carrier Mills, Chester, Harrisburg, Vergennes, & Welge Bedrock Geology	249,196	249,196	498,392
2006	Ames, Barrington, Freeburg, Streamwood, & West Chicago Surficial Geology Cypress, Murphysboro, & Pomona Bedrock Geology	227,531	228,999	456,530
2007	New Athens East, New Athens West, & Wheeling Surficial Geology Brussels, Herod, Nutwood, & Winfield Bedrock Geology	242,230	243,550	485,780
2008	Aurora South, Paderborn, Red Bud, & Zion Surficial Geology Altenburg, Goram, & Shetlerville Bedrock Geology	228,592	229,832	458,424
2009	Naperville, Waukegan, & St. Clair County Surficial Geology Oregon, Foley, & Karbers Ridge Bedrock Geology	253,109	254,574	507,683
2010	Gifford, Highland Park, & Yorkville Surficial Geology Grand Detour, Mt. Morris, & Rosiclare Bedrock Geology	226,152	228,625	454,776
	TOTALS **Total number of maps: 127**	**$2,989,032**	**$3,322,940**	**$6,311,971**

June 2010

Geologic Mapping in Illinois

The Illinois State Geological Survey has a continuing project to map the geology of the entire state, in three dimensions, from land surface down to and into the bedrock, at the detailed scale of 1:24,000 (1 inch = 2000 feet). The STATEMAP part of the National Cooperative Geologic Mapping Program has contributed significantly to advancing this project. From its inception in 1993, STATEMAP supported projects have focused on three areas: 1) mapping the glacial deposits in rapidly urbanizing areas of the Chicago metropolitan area; 2) mapping the bedrock and surficial deposits exposed in southernmost Illinois, primarily to seek evidence of relatively recent faulting in this earthquake-prone area astride the New Madrid and Wabash Valley seismic zones; and 3) mapping the glacial deposits and bedrock in the rapidly urbanizing area on the Illinois side of the Mississippi River opposite St. Louis. The STATEMAP program also contributed to an important pilot project to create a three-dimensional model at the 1:100,000-scale (1 inch = about 1.6 miles) of the complex glacial geology in east-central Illinois which includes the Mahomet Aquifer. Illinois' geology is dominated by complexly layered deposits of clay, sand and gravel, and boulders laid down by continental glaciers that repeatedly flowed across the land and melted away during the last 1.6 million years. With few outcrops to study, geologists must rely on drilling to map these deposits in the subsurface, an inherently expensive process. Our state's rich farmland, some of the most productive in the world, owes its fertility to the abundant mineral nutrients in the finely ground rock materials that are the parent materials of the state's soils. The glacial deposits also are the primary source of drinking water for 37% of the state's total population, and more than 90% of the rural population, and contain abundant supplies of sand and gravel for use as construction materials. The people of Illinois, who live on and use the state's earth materials, need more information about the state's geology to successfully maintain natural areas and restore unique habitats, locate new drinking-water sources and keep existing ones free of contamination, and to properly site landfills and other potentially harmful but essential industries. Careful economic analysis of the costs and benefits of having and using geologic maps, based on the use of geologic maps in Kentucky, (the only state fully mapped at the 1:24,000-scale) showed that every dollar invested in geologic mapping will return at least 25 to 39 dollars. Maps delivered annually to the USGS are now made immediately available to the public as digital graphics through the ISGS website, and are published soon after in the Illinois Geologic Quadrangle map (IGQ) series. ISGS geologic maps (both surficial and bedrock) are being increasingly used by consultants, engineers, government agencies, educators, businesses, and scientists for a variety of purposes. For example, an engineering company in the St. Louis Metro East region recently used our maps to aid their investigation of a landslide in the Grafton, Illinois area. The landslide was controlled by the near-surface occurrence of a shale layer that is particularly susceptible to failure. The near-surface occurrence of bedrock (as indicated in the surficial map) and its distribution (as indicated on the bedrock map) were useful information for the client as they helped to highlight areas at risk for future landslides.

Outcome Statement for 2009-2010 STATEMAP Project

Scientists with Little River Research and Design, a private consulting company that provides services in river conservation, including applied river geomorphology and river ecosystem restoration, have worked on the historic hydrology of the Cache River in southern Illinois. A number of geologic maps published by the ISGS have aided their work in the Cache Valley.The Cache Valley is a former route of the ancestral Ohio River. The valley is wide and is occupied by the underfit Cache River. The Cache Valley holds a unique ecosystem including the largest bald cyprus trees in the state and one of only 16 wetlands in the United States listed by the United Nations' UNESCO division as wetlands of international importance. A survey in 2007 by Little River Research and Design of a river terrace along the Cache revealed an unusually low wetland in the Cypress Quadrangle. The origin of the wetland could not be explained at the time of their survey. Subsequent publication of the Cypress geologic map in 2009 showed two factors that could explain the origin of the wetland or low area in that part of the Cache River basin. First, that part of the river is underlain by a 300 foot thick limestone that is prone to karst development (St. Louis Limestone). Second, faults were mapped striking northeast into the Cache River in the eastern part of the low terrace. A number of hypotheses have now been developed for the origin of the wetland: 1) simple karst development and piping; 2) seismic activity creating a graben; and 3) karst collapse due to seismic activity (the Cache Valley is in a seismically active area.)

References

Devera, J.A and W.J. Nelson, 2009, Geology of Cypress Quadrangle, Union, Johnson, and Pulaski Counties, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Cypress-G, 2 sheets, 1:24,000.