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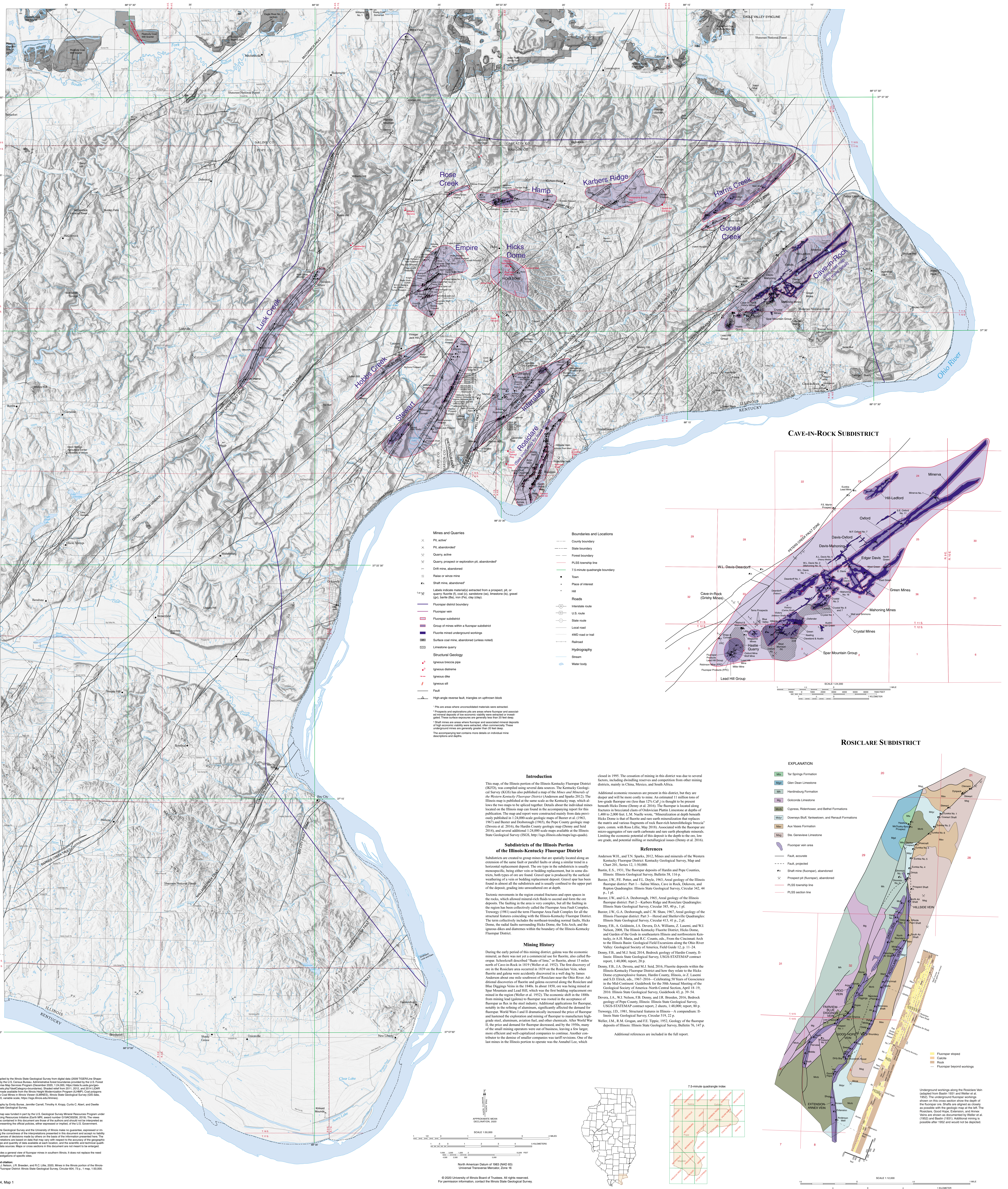
MINES IN THE ILLINOIS PORTION OF THE ILLINOIS-KENTUCKY FLUORSPAR DISTRICT

F. Brett Denny, W. John Nelson, Jeremy R. Breeden, and Ross C. Lillie

2020


40'
88° 37' 30"
35'
88° 30'
25'
88° 22' 30"
20'
88° 15'
10'
88° 07' 30"
37° 37' 30"
35'
32' 30"
37° 30'
27' 30"
25'
37° 22' 30"
20'
37° 15'
37° 10'
37° 07' 30"
R. 5 E.
R. 6 E.
R. 7 E.
R. 8 E.
R. 9 E.
R. 10 E.
T. 10 S.
T. 11 S.
T. 12 S.
T. 13 S.
T. 14 S.
T. 15 S.
T. 16 S.
T. 17 S.
Peabody Coal Will Scarlet
Eagle River No. 1 (active)
Saxton Coal Walnut Grove
Williams No. 1
Young Coal Somerset
Stone Face
Silver Mine 40
Mitchellsville
Rudement
Saline River
South Fork
Shawnee National Forest
McCORMICK FAULT
Stonefort
Horton Hill
Murray Bluff
Wamble Mountain
Gibbons
SALINE CO
POPE CO
GALLATIN CO
HARDIN CO
Garden of the Gods
High Knob
Kedron
Jader Fuel Illinois Fuel
Leamington
Peabody Coal Eagle Strip
Gibsonia
Reclaimed Coal Surface Mine
EAGLE VALLEY SYNCLINE
Tolbert Mine
Pounds Hollow
Blue Brick
Sand Hill
Delwood
SHAWNEETOWN FAULT ZONE
HEROD FAULT ZONE
Williams Hill
Herod
Rose Creek
Hamp
HAMP FAULT
Karbers Ridge
RIDGE FAULT
LEE FAULT
Philadelphia School Dike
Sparks Hill Diatreme
Hall Zinc Prospect
Harris Creek
Annabel Lee
Main Shaft
GOOSE CREEK FAULT ZONE
Goose Creek
Saline Landing
McCormick Lookout Tower
Burden Falls
McCormick
Potato Hill
Williams Diatreme
Chamberlain Diatreme
Empire
EMPIRE FAULT
Hicks
Hicks Dome
HICKS DOME
Rose Mine Plug-Dike
Robinson Dike
Jamie Dike
Grant Intrusive
ROCK CREEK GRABEN
Hill-Ledford
Minerva
Oxford
Davis-Mahoning
Davis-Oxford
W.L. Davis-Deardorff
Green Mines
Mahoning Mines
Cave-In-Rock (Grishy Mines)
Crystal Mines
Spar Mountain Group
Hastie Quarry
Lead Hill Group
Cave-In-Rock (See inset map for more detail)
Shawnee National Forest
Lafarge Quarry
Shawnee Stone Lafarge Quarry
Brokaw Hill
Lamb
Hamilton Hill
Battery Rock
Brown Hill
Barker Bluff
Cave-in-Rock
Cave-in-Rock State Park
Tower Rock
Ohio River
ILLINOIS
KENTUCKY
Bell Smith Springs
Eddyville
Lusk Creek
LUSK CREEK FAULT ZONE
RAUM FAULT ZONE
Raum
Lost 40
Ora Scott
Gilbert Prospect
Luella
Clay Diggings
Rock Candy Mountain
Tripod
Moore
DeSautels
Vinegar Jack Hill
Leisure City
HOBBS CREEK FAULT ZONE
Hobbs Creek
SHELBY FAULT
Julien Hill
Stewart
STEWART FAULT
BARNETT FAULT
Eichorn
Interstate
INTERSTATE FAULT ZONE
TWITCHELL FAULT
PELL FAULT
BIG CREEK FAULT
WOLRAB MILL FAULT ZONE
IRON FURNACE FAULT ZONE
HOGTHIEF CREEK FAULT ZONE
PETERS CREEK FAULT ZONE
SHETLERVILLE FAULT
WALLACE BRANCH FAULT ZONE
Rosiclare (See inset map for more detail)
Rosiclare
Hillside Vein
Rosiclare Vein
Daisy Vein
Argo Vein
Fairview-Blue Diggings Vein
Good Hope Vein
Extension-Annex Vein
Orr's Landing Dike
Rosiclare Dikes
Downeys Bluff Sill
North Soward Plug
Soward Plug
Lavender Hill
Humm Hill
Keeling Hill
Elizabethtown
Millstone Bluff
Robbs
Glendale
Dixon Springs Agricultural Center University of Illinois
Lake Glendale
DIXON SPRINGS GRABEN
Dixon Springs
Waltersburg
Golconda
Little Jean
Renshaw
Bay Creek
Deputy Hill
Brownfield
Brownfield Bluff
Homberg
Temple Hill
Rosebud
Bay City Mine
Compton
COMPTON MINE FAULT
Bay City
BAY CITY FAULT ZONE
POPE CO
MASSAC CO
Midway
BARNES CREEK FAULT
MALLARD CREEK FAULT
ALCORN CREEK FAULT
DYER HILL FAULT
Smithland Lock and Dam
Hamletsburg
Brookport
Shady Grove
Unionville
New Liberty
Clear Lake
Kinkaid Mounds
Avery Lake

Mines and Quarries

- ✕ Pit, active[1]
- ✕ Pit, abandoned[1]
- ⚒ Quarry, active
- ⚒ Quarry, prospect or exploration pit, abandoned[2]
- ⤚ Drift mine, abandoned
- ⊠ Raise or winze mine
- ◩A Shaft mine, abandoned[3]
- f, gv ⚒ Labels indicate material(s) extracted from a prospect, pit, or quarry: fluorite (f), coal (c), sandstone (ss), limestone (ls), gravel (gv), barite (Ba), iron (Fe), clay (clay).
- Fluorspar district boundary
- Fluorspar vein
- Fluorspar subdistrict
- Group of mines within a fluorspar subdistrict
- Fluorite mined underground workings
- sm Surface coal mine, abandoned (unless noted)
- ▨ Limestone quarry

Structural Geology

- ● B Igneous breccia pipe
- ● D Igneous diatreme
- Igneous dike
- Igneous sill
- Fault
- High-angle reverse fault, triangles on upthrown block

Boundaries and Locations

- County boundary
- State boundary
- Forest boundary
- PLSS township line
- 7.5-minute quadrangle boundary
- ● Town
- • Place of interest
- + Hill

Roads

- Interstate route
- U.S. route
- State route
- Local road
- 4WD road or trail
- Railroad

Hydrography

- Stream
- Water body

[1] Pits are areas where unconsolidated materials were extracted.

[2] Prospects and explorations pits are areas where fluorspar and associated mineral deposits of low economic viability were extracted or investigated. These surface exposures are generally less than 20 feet deep.

[3] Shaft mines are areas where fluorspar and associated mineral deposits of high economic viability were extracted, often commercially. These underground mines are generally greater than 20 feet deep.

The accompanying text contains more details on individual mine descriptions and depths.

CAVE-IN-ROCK SUBDISTRICT

22
23
24
29
28
27
26
25
30
32
33
34
35
36
31
5
4
3
2
1
6
T. 11 S.
T. 12 S.
R. 9 E.
R. 10 E.
PETERS CREEK FAULT ZONE
Minerva
Minerva No. 1
Hill-Ledford
Eureka Lead Mine
F.E. Martin Prospect
S.E. Oxford No. 11
Oxford
M.F. Oxford No. 7
Davis-Oxford
Davis-Mahoning
A.L. Davis No. 4 (Heavy Media)
W.L. Davis No. 2 (Mahoning No. 3)
Edgar Davis
North Green
West Green
W.L. Davis-Deardorff
W.L. Davis No. 1
E. Davis
A.L. Davis
East Green
Deardorff No. 1
Green Mines
Deardorff (Patton)
Mahoning No. 16
Crystal No. 3
Cave-in-Rock (Grishy Mines)
Victory (Carlos Shaft)
Lackey
Crystal No. 6 and 7
Mahoning Mines
Victory (Addison Shaft)
Crystal No. 1
Wall and Simmons
Tems Prospects
Blue Valley
Hillside
Defender
Austin-East Green
Crystal Mines
Walnut & Walnut Drift
Little
Green
Keeling
Cleveland & Austin
Shipp & Convert
FPC
Magazine Mines
Hastie Quarry
Barite Drift
West Morrison Pit
Oxford Pit
Spar Mountain Group
Fluorspar Products Lead Hill Group
Oxford Mine
Wolf Mine
Lead Hill Mine
Robinson Mine (FPC)
Miller Mine
Fluorspar Products (FPC)
Lead Hill Group
SCALE 1:24,000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

ROSICLARE SUBDISTRICT

EXPLANATION

Mts	Tar Springs Formation
Mgd	Glen Dean Limestone
Mh	Hardinsburg Formation
Mg	Golconda Limestone
Mcrb	Cypress, Ridenhower, and Bethel Formations
Mdyr	Downeys Bluff, Yankeetown, and Renault Formations
Mav	Aux Vases Formation
Msg	Ste. Genevieve Limestone

- Fluorspar vein area
- Fault, accurate
- Fault, projected
- ◩A Shaft mine (fluorspar), abandoned
- ⚒ Prospect pit (fluorspar), abandoned
- PLSS township line
- PLSS section line

20
21
29
28
31
32
5
6
7
8
T. 12 S.
T. 13 S.
Clement
Dyspeck
Stewart
Eureka No. 1
Cowsert Shaft
Hawkins
McClusky-Byrd Prospect
Eureka No. 2
Eureka No. 6
Decker Prospect
Shoecraft
Eureka No. 3
Eureka No. 5
Eureka No. 4
Dimmick No. 1
Dimmick
Dimmick No. 2
Prospect Shaft
North Air Shaft
HILLSIDE VEIN
Daisy No. 1
Daisy No. 2
Hillside Plant Shaft
DAISY VEIN
South Air Shaft
North Boundary
Midway Shaft
Rosiclare Air Shaft
ROSICLARE VEIN
Stone
Smith
Argo
Cincinnati
Ghelia
ARGO VEIN
Blue Diggings
Rosiclare Plant
Rosiclare Shaft
FAIRVIEW-BLUE DIGGINGS VEIN
Roper
Last Chance No. 1
Last Chance No. 2
Prospect No. 1
Pell
White
Deep
GOOD HOPE VEIN
Boundary
North
Prospect No. 2
Fairview
Sweat
New
No. 4
Middle
Dirty Boy
Buzzard's Roost
South
Good Hope
Alcoa
Shop
Annex
Extension
Anderson Well
EXTENSION-ANNEX VEIN
Hillside Property Line
Water Course (500 gallon per minute)
Property Boundary
Fluorspar stoped
Calcite
Rock
Fluorspar beyond workings
SCALE 1:12,000
1/2 0 1/2 1 MILE
.5 0 .5 1 KILOMETER

Underground workings along the Rosiclare Vein (adapted from Bastin 1931 and Weller et al. 1952). The underground fluorspar workings shown on this cross section show the depth of the fluorspar ore. Shafts are aligned as closely as possible with the geologic map at the left. The Rosiclare, Good Hope, Extension, and Annex Veins are shown as documented by Weller et al. (1952) and Bastin (1931). Additional mining is possible after 1952 and would not be depicted.

Introduction

This map, of the Illinois portion of the Illinois Kentucky Fluorspar District (IKFD), was compiled using several data sources. The Kentucky Geological Survey (KGS) has also published a map of the *Mines and Minerals of the Western Kentucky Fluorspar District* (Anderson and Sparks 2012). The Illinois map is published at the same scale as the Kentucky map, which allows the two maps to be spliced together. Details about the individual mines located on the Illinois map can found in the accompanying report for this publication. The map and report were constructed mainly from data previously published in 1:24,000-scale geologic maps of Baxter et al. (1963, 1967) and Baxter and Desborough (1965), the Pope County geologic map (Devera et al. 2016), the Hardin County geologic map (Denny and Seid 2014), and several additional 1:24,000 scale maps available at the Illinois State Geological Survey (ISGS, http://isgs.illinois.edu/maps/isgs-quads).

Subdistricts of the Illinois Portion of the Illinois-Kentucky Fluorspar District

Subdistricts are created to group mines that are spatially located along an extension of the same fault or parallel faults or along a similar trend in a horizontal replacement deposit. The ore type in the subdistricts is usually monospecific, being either vein or bedding replacement, but in some districts, both types of ore are found. Gravel spar is produced by the surficial weathering of a vein or bedding replacement deposit. Gravel spar has been found in almost all the subdistricts and is usually confined to the upper part of the deposit, grading into unweathered ore at depth.

Tectonic movements in the region created fractures and open spaces in the rocks, which allowed mineral-rich fluids to ascend and form the ore deposits. The faulting in the area is very complex, but all the faulting in the region has been collectively called the Fluorspar Area Fault Complex. Treworgy (1981) used the term Fluorspar Area Fault Complex for all the structural features coinciding with the Illinois-Kentucky Fluorspar District. The term collectively includes the northeast-trending normal faults, Hicks Dome, the radial faults surrounding Hicks Dome, the Tolu Arch, and the igneous dikes and diatremes within the boundary of the Illinois-Kentucky Fluorspar District.

Mining History

During the early period of this mining district, galena was the economic mineral, as there was not yet a commercial use for fluorite, also called fluorspar. Schoolcraft described "fluate of lime," or fluorite, about 15 miles north of Cave-in-Rock in 1819 (Weller et al. 1952). The first discovery of ore in the Rosiclare area occurred in 1839 on the Rosiclare Vein, when fluorite and galena were accidently discovered in a well dug by James Anderson about one mile southwest of Rosiclare near the Ohio River. Additional discoveries of fluorite and galena occurred along the Rosiclare and Blue Diggings Veins in the 1840s. In about 1850, ore was being mined at Spar Mountain and Lead Hill, which was the first bedding replacement ore mined in the region (Weller et al. 1952). The economic shift in the 1880s from mining lead (galena) to fluorspar was rooted in the acceptance of fluorspar as flux in the steel industry. Additional applications for fluorspar, notably in the refining of aluminum, significantly affected the demand for fluorspar. World Wars I and II dramatically increased the price of fluorspar and hastened the exploration and mining of fluorspar to manufacture high-grade steel, aluminum, aviation fuel, and other chemicals. After World War II, the price and demand for fluorspar decreased, and by the 1950s, many of the small mining operators were out of business, leaving a few larger, more efficient and well-capitalized companies to prosper. Another contributor to the demise of smaller companies was tariff revisions. One of the last mines in the Illinois portion to operate was the Annabel Lee, which closed in 1995. The cessation of mining in this district was due to several factors, including dwindling reserves and competition from other mining districts, mainly in China, Mexico, and South Africa.

Additional economic resources are present in this district, but they are deeper and will be more costly to mine. An estimated 11 million tons of low-grade fluorspar ore (less than 12% CaF_2) is thought to be present beneath Hicks Dome (Denny et al. 2016). The fluorspar is located along fractures in brecciated clasts of Ordovician Plattin Limestone at depths of 1,400 to 2,000 feet. L.M. Nuelle wrote, "Mineralization at depth beneath Hicks Dome is that of fluorite and rare earth mineralization that replaces the matrix and various fragments of rock fluor-rich heterolithologic breccia" (pers. comm. with Ross Lillie, May 2018). Associated with the fluorspar are micro-aggregates of rare earth carbonate and rare earth phosphate minerals. Limiting the economic potential of this deposit is the depth to the ore, low ore grade, and potential milling or metallurgical issues (Denny et al. 2016).

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Additional references are included in the full report.

Base map compiled by the Illinois State Geological Survey from digital data (2009 TIGER/Line Shapefiles) provided by the U.S. Census Bureau. Administrative forest boundaries provided by the U.S. Forest Service Enterprise Map Services Program (December 2020, 1:24,000, https://data.fs.usda.gov/geodata/edw/datasets.php?dsetCategory=boundaries). Shaded relief from 2011, 2012, and 2014 LiDAR elevation data made available from the Illinois Height Modernization Program (ILHMP). Coal polygons provided by the Coal Mines in Illinois Viewer (ILMINES), Illinois State Geological Survey (GIS data, December 2020, variable scale, https://isgs.illinois.edu/ilmines).

Digital cartography by Emily Bunse, Jennifer Carrell, Timothy A. Kropp, Curtis C. Abert, and Deette Lund, Illinois State Geological Survey.

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This map provides a general view of fluorspar mines in southern Illinois. It does not replace the need for detailed investigations of specific sites.

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3°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2020

SCALE 1:50,000
1 1/2 0 1 2 3 4 MILES
1 .5 0 1 2 3 4 5 KILOMETERS
5,000 3,500 1,500 0 10,000 FEET

North American Datum of 1983 (NAD 83)
Universal Transverse Mercator, Zone 16

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7.5-minute quadrangle index

CARRIER MILLS
HARRISBURG
RUDEMENT
EQUALITY
SHAWNEETOWN
GROVE CENTER
STONEFORT
EDDYVILLE
HEROD
KARBERS RIDGE
SALINE MINES
DEKOVEN
GLENDALE
WALTERSBURG
SHETLERVILLE
ROSICLARE
CAVE-IN-ROCK
REPTON
REEVESVILLE
BROWNFIELD
GOLCONDA
METROPOLIS
PADUCAH NE
SMITHLAND
PADUCAH WEST
PADUCAH EAST
LITTLE CYPRESS
Saline
Gallatin
Hardin
Pope
Massac